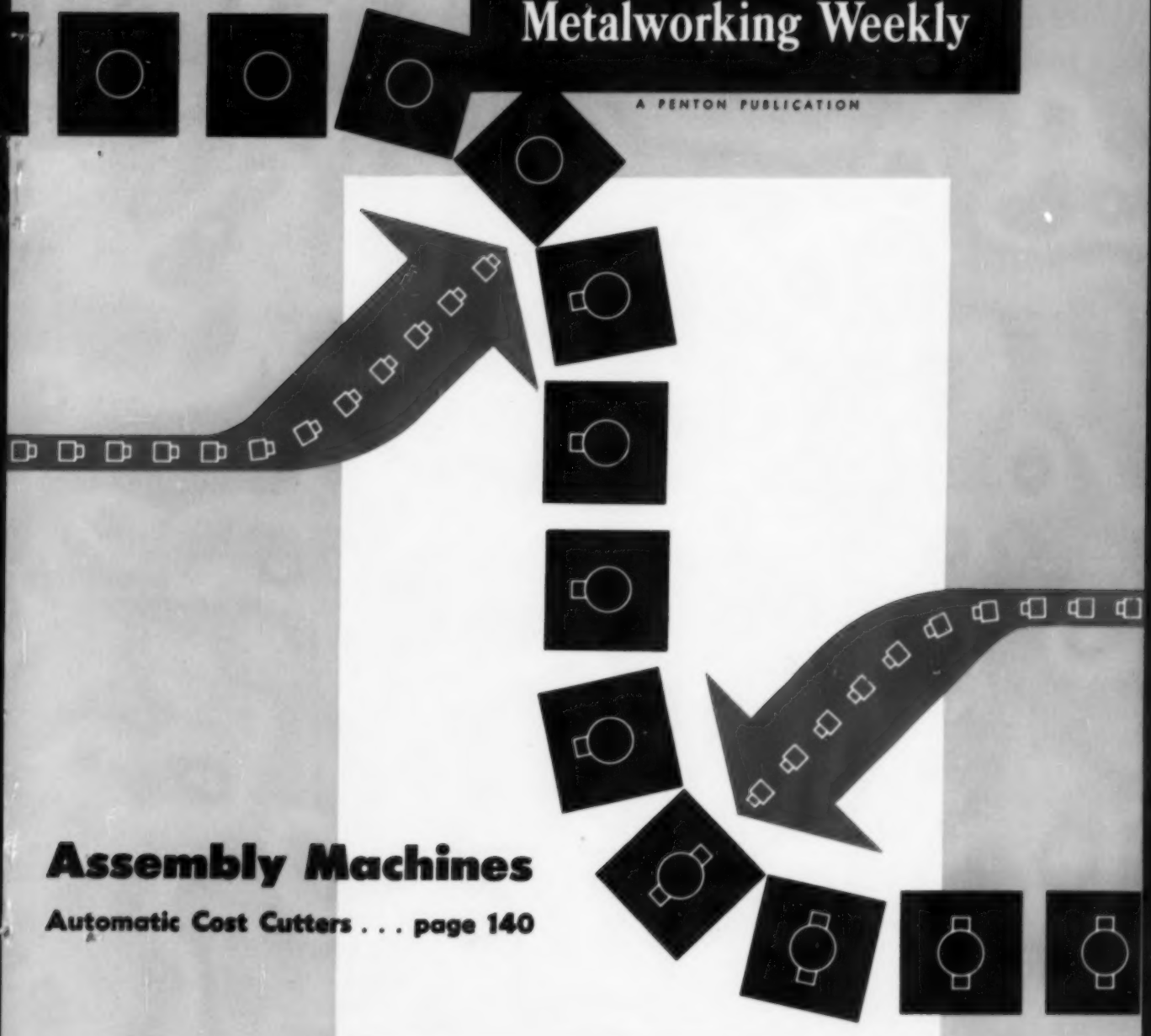
SEPTEMBER 10, 1956

STEEL

The Metalworking Weekly

A PENTON PUBLICATION



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Aetna-Built
CONTINUOUS GALVANIZING LINES

25th

UNDER WAY

WILL THE

26th

BE YOURS?

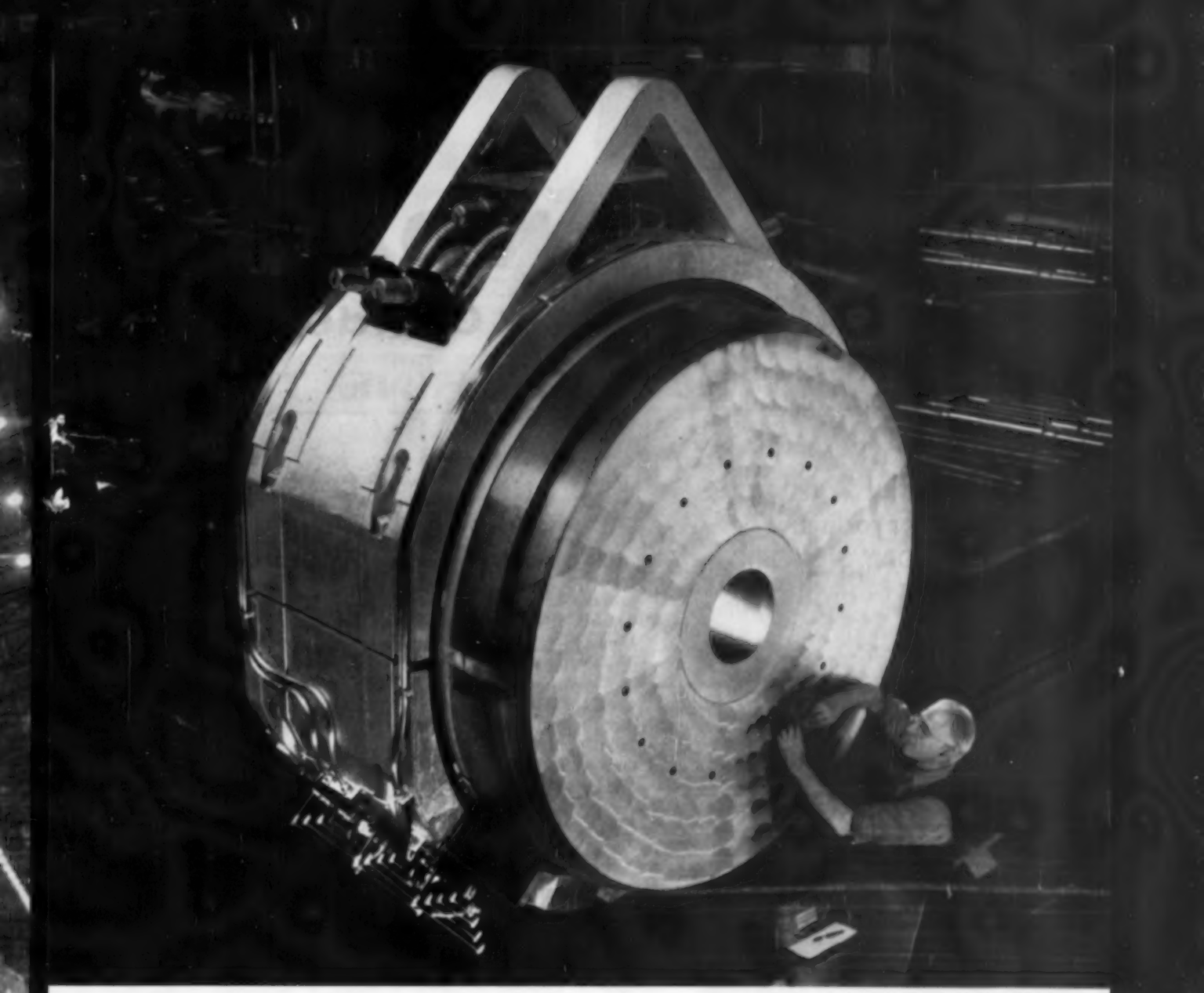
• The 26th line can be any process or type of Continuous Galvanizing in use today. Aetna-Standard has built more lines than all other manufacturers combined. If you are considering a continuous galvanizing line, Aetna has the facts, figures, production rates and other data on which you can base a sound decision. Why not make the 26th your line?

AETNA • STANDARD

THE AETNA-STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA. **PLANTS: ELLWOOD CITY, PA., WARREN, OHIO**

CONTINUOUS GALVANIZING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC



Puzzle: Find the Sleeve

Unless you had a hand in the design or manufacture of this alloy steel billet-container, you might have trouble finding the sleeve we're talking about. Yet part of it is in plain sight.

First of all, we'd better explain a little about the assembly. That outer shell with the lifter loops is heating equipment. Just inside this shell is the billet-container proper, made entirely in the Bethlehem shops. The whole device will be part of one of the 8,000-ton extrusion presses designed and built by Loewy-Hydropress, Division of Baldwin-Lima-Hamilton, for the U.S.A.F. Heavy Press Program.

Now, getting back to the mystery of the sleeve. The container is made up basically of three layers of forgings — a liner (plainly visible), the sleeve, and an outer layer. Because of the perfect shrink fit and the accurate machining, you can't see where the sleeve meets the outer layer. But the sleeve is there, all right, and it runs the full length of the assembly.

Bethlehem has handled many forging and machining jobs that were bigger than this one; the whole assembly weighs only 41 tons. But we've had very few that required more careful workmanship. The container shown here is one of several that Bethlehem was commissioned to do — and all will of course be built to the same high standards.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Heald VERSATILITY in action

How a STANDARD* Plain Internal Grinder SAVED IDLE MACHINE TIME

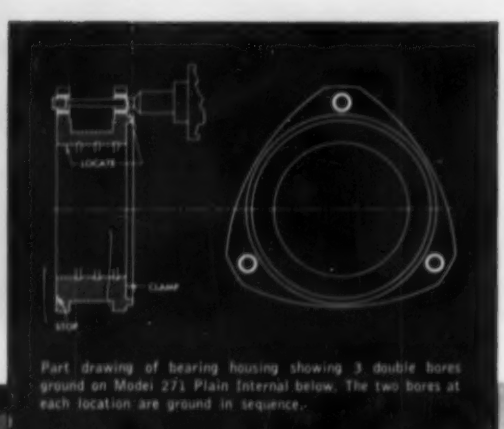
Heald Model 271 does a month's production ALL IN A DAY'S WORK . . . and can do many other jobs in its "spare time"

THE race is not always to the swift. For example: An aircraft manufacturer requested a quotation on a Model 271 Size-Matic for grinding three double bores in a bearing housing. Production requirements — 25 parts per month. A high-speed Size-Matic would do the whole job in less than a day — and be idle the rest of the time. So Heald engineers recommended a Model 271 Plain Internal instead. This *semi-automatic* machine could still do the whole month's production in one day — yet because of its inherent *versatility*, the standard Plain machine could be used for many other internal grinding jobs in its "spare time".

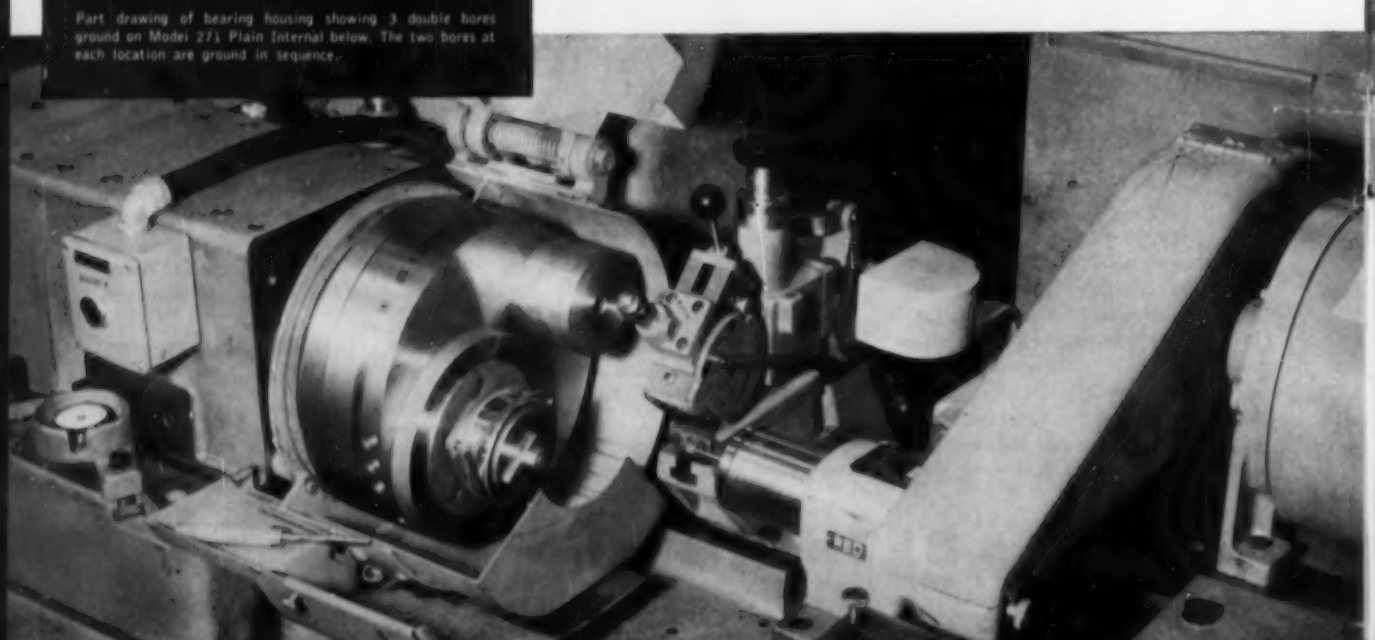
This solution to the problem not only saved on the initial investment, but avoided idle machine time and contributed to greater productivity and lower costs. The 271 Plain Internal, and the job for which it was ordered, are shown below. For the *best answer* to any precision finishing problem . . .

It PAYS to come to Heald

**Send for Bulletin 2-2569-1, Issue 1.*



Part drawing of bearing housing showing 3 double bores ground on Model 271 Plain Internal below. The two bores at each location are ground in sequence.



HEALD®

THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.

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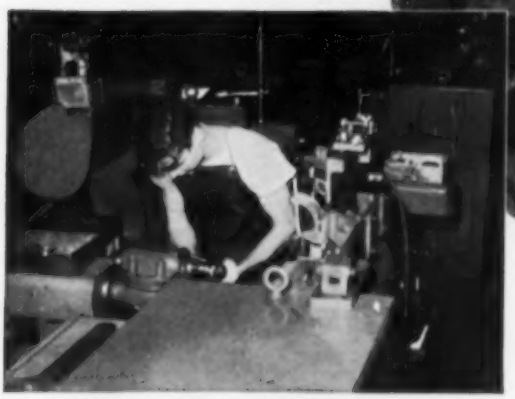
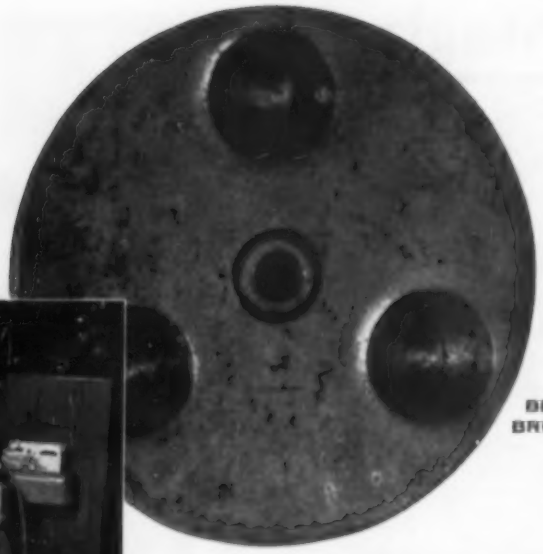


A manufacturer of computers and business machines improves the quality of precision components, greatly reduces costs using Osborn Brushamatic machines.



BEFORE BRUSHING

AFTER BRUSHING

Low price on high finish

A few years ago, precision parts were finished in custom lots at considerable cost. Today, Osborn power brushing methods put finer finishes on precision parts at mass-production rates.

The business machine component shown above is typical. Brushamatic® Machines put a high, mirror-like finish on all flat and depressed surfaces of this ball retainer in just 25 seconds—*finish 6 parts for the former cost of finishing 1.*

An **O**sborn **B**rushing **A**nalysis, made in your plant at no obligation, will show how *you* can use Brushamatic® methods to produce finer finishes at lower cost. Write THE OSBORN MANUFACTURING COMPANY, DEPT. G-49, 5401 HAMILTON AVENUE, CLEVELAND 14, OHIO.

Osborn Brushes

OSBORN

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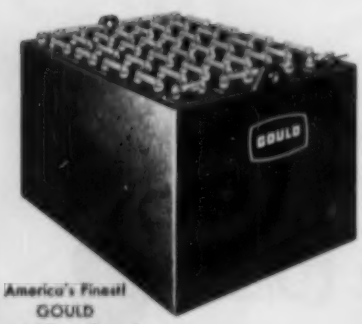
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

"There's Nothing Platonic About My Love for *gould* Batteries"



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Industrial Truck Batteries

Anyone can become really fond of something that cuts costs year after year. That's why we have so many Gould enthusiasts. Gould battery power is the lowest cost power on the market. Why not cut your costs with Gould Research-Built Battery Power.
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gould
BATTERIES

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The Metalworking Weekly

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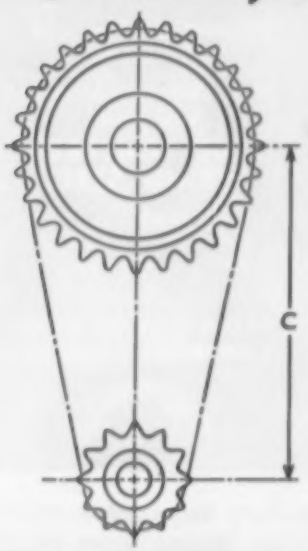
Designers!

Determine this Chain Length



GIVEN:

Teeth in small sprocket	17
Teeth in large sprocket	78
Center Distance	36"
Pitch of Chain	1"

To find — Chain length in inches.

(Answer below)

Acme Chains latest 76 page catalog brims with chain data. Filled with information on the correct and most efficient use of roller chain, cable chain and all types of sprockets. Among many other things it gives you the correct formula for computing proper chain lengths.

Answer: 122.12

FREE

76-page Catalog on application and use of Chains sent on written request. Write Dept. 10E, Acme Chain Corp., Holyoke, Mass.

Acme Chain Corporation
HOLYOKE MASSACHUSETTS

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there's so much to choose from at Hotel Cleveland!

What's your pleasure? Fabulous roast beef in Cleveland's first specialty restaurant The Rib Room. Dancing to a famous orchestra in the smart Bronze Room. Relaxing over a drink in the stag Men's Bar. You'll find something to suit every taste and mood at Hotel Cleveland.

And you're in the very heart of town, close to business, shopping and theaters . . . directly connected with Union Passenger Terminal.

behind the scenes

Automation Today

It ain't right to put words in other folks' mouths, but we can almost hear the Olin Mathieson Chemical Co., East Alton, Ill., murmuring: "My heart leaps up when I behold a mess of children darting about on roller skates. Because if they are wheeling around on OUR roller skates, they're skimming on skate wheels that were assembled 40 per minute without the aid of human hands."

The Olin Mathieson wheel consists of 9 parts and 20 ball bearings, and management people felt that assembling it by hand was definitely something for the birds. They approached Ferguson Machine & Tool Co. Inc., subsidiary of Universal Match Corp., St. Louis, and asked the company to build a machine to assemble skate wheels automatically. Just a little old assembly machine to turn out roller skate wheels for the kiddies—something costing about an hundred thousand dollars (and you just leave that "an" in there, Mr. Proofreader, because when you're speaking about a hundred grand, it merits old-fashioned respect).

The Ferguson people, pioneers in automation, whipped up a contraption that turns out 40 wheels per minute, and anybody with a slide rule can tell you that if it continues to operate unchecked, we will all be on roller skates at some precise moment in the measurable future. STEEL presents an interesting article this week on assembly machines, beginning on page 140. The above comments are merely introductory; to get the facts, turn to the story.

Expansion News

During a summer conclave of STEEL editors (Holy mackerel! We just looked up the spelling of "conclave," and discovered that it means a room wherein cardinals lock themselves while selecting a new pope. STEEL's conference room has never been employed for that purpose, so let's skip "conclave," and start all over again.) During a summer conference of STEEL editors, a suggestion was made concerning news and notices of industrial expansion in metalworking. The idea was to group these notices on a single page, so a reader wouldn't be obliged to flip all through the magazine to learn about who is expanding where, or what outfit is adding to its facilities. The page containing this capsule information immediately preceeds the Windows of Washington. Now a regular feature, it first appeared in the Aug. 27 issue.

The Ladies Speak

Once upon a time we were naive enough to ask the lady readers of STEEL for some shots of constructive criticism. The general tone of the over-all response was so gentle and amiable we immediately lost all chronic fear of women. Miss Ruth Morgan, executive secretary, Steel Co. of Canada Ltd., with offices in St. John, N.B., confesses that Editor-in-chief Irwin Such's editorial is the high note of the magazine for her.

Miss M. C. Fricke, purchasing agent, Manitowoc Shipbuilding Inc., Manitowoc, Wis., confesses that she is favorably impressed by STEEL, but objects to "advertising that shows a well-rounded girl clad only in shorts and bra demonstrating an air hammer, or something." Ah, Miss Fricke! You speak truly. It's a man's world, isn't it?

Mrs. John G. McCarren of Dumont, N. J., has the eyes of a woman and the eyes of an engineer because she is a woman-engineer, and when she looks through STEEL, she gets a double impression: As a woman, she finds it's frightfully dull; as an engineer, she finds it interesting. She likes the make-up and typography, but remarks that it carries nothing about women. "There must be many women in interesting and responsible positions," she writes, "so you might consider some features on women at work in the industries you cover."

We have sent all the delightful correspondence to the editorial conclave, and even if it doesn't produce a new pontif, it may stir up some new features.

Shrdlu

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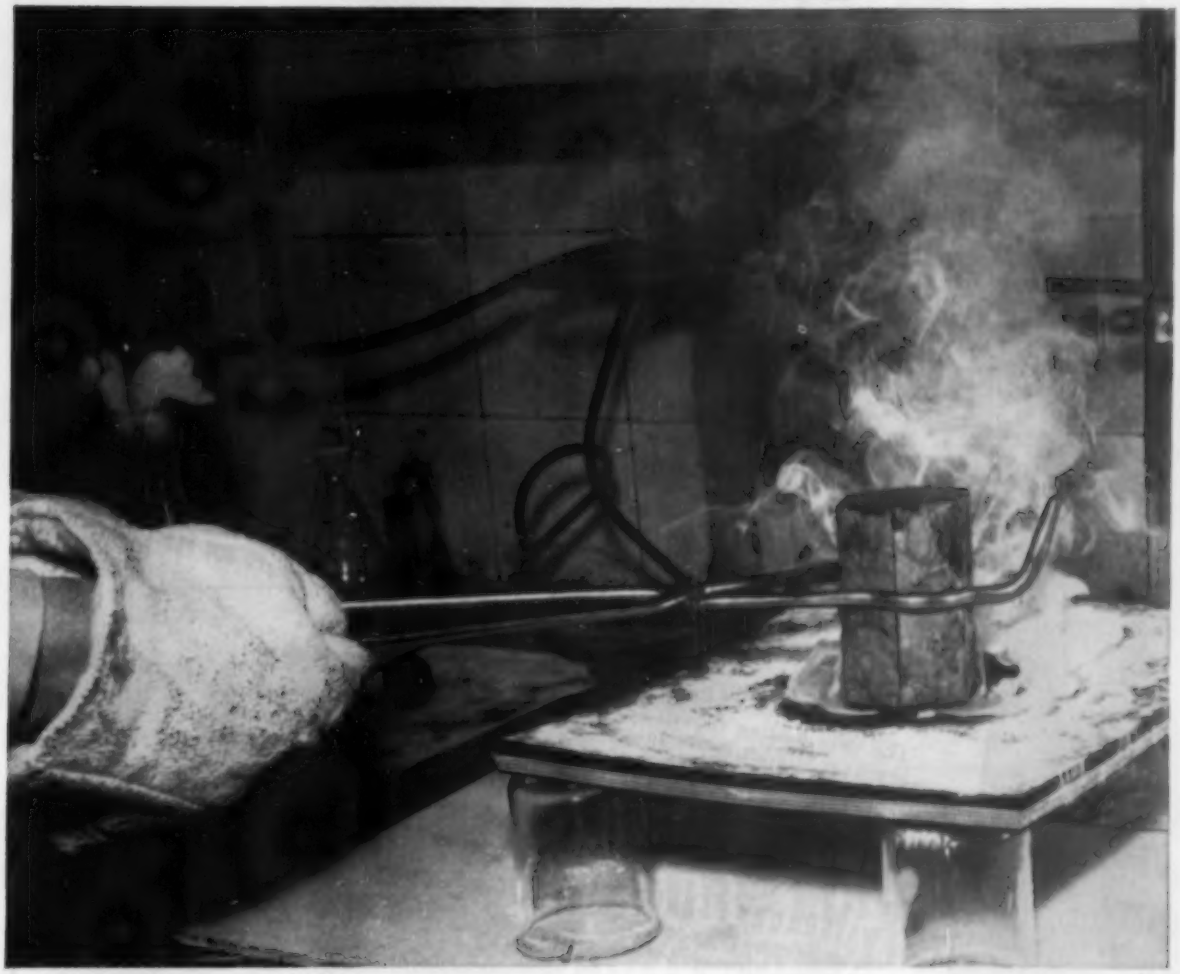
B.F.Goodrich



Red-hot metal won't burn through this B.F.Goodrich conveyor belt

New fire curtain means longer life for hot-material belts

SCORCHING chunks of metal that sometimes land on foundry conveyor belts won't burn holes through a B. F. Goodrich conveyor belt with the built-in fire curtain.

This new protective shield is two layers of glass fabric that B. F. Goodrich puts into the top cover of hot-material conveyor belts. If a hot chunk of metal accidentally drops on the belt, the rubber cover chars at the spot, but only down to the glass fabric fire curtain. Since the hot object doesn't penetrate the glass fabric barrier, the belt keeps its strength and so, of course, lasts longer than belts without this protection.

To demonstrate the effectiveness of the fire curtain, tests were run on two hot-material belts. One belt had the B. F. Goodrich fire curtain protection; the other did not. A red-hot steel bar was placed on each belt. It burned through the rubber covers on both belts. And it burned a hole clear through the unprotected belt. But the B. F. Goodrich fire curtain stopped the burning chunk, so that the body of the protected belt was undamaged.

The fire curtain protection is ideal for foundry service where burnt holes are the major cause of short belt life. It can be built into any B. F. Goodrich hot-material belt. Talk it over with a B. F. Goodrich distributor and see if this new belting improvement is the answer to your hot material problems. *B. F. Goodrich Industrial Products Company, Dept. M-740, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

NEW!

WATERBURY FARREL SLOTTER

"Model 5"

DELIVERS UP TO 51,840 (BURR FREE) BLANKS PER HR....

SLOTS STANDARD & SPECIAL SCREW HEADS, FERROUS OR NON-FERROUS BLANKS #6 TO ¼" DIA., UP TO 2½" LONG, AT VARIABLE SPEEDS FROM 60 TO 864 PER MINUTE.

ONE "Model 5" Outproduces TWO Earlier Type Slotters

The speed and work range of this completely new Waterbury Farrel slotter make it more productive than a *pair* of earlier type slotters which used indexing dials and saw-into-work sequence.

The "Model 5" has long and short run versatility, too. Its simplicity and rapid set up make it economical for short runs while its high speed pays extra dividends on long runs.

Inexpensive Tooling

The only tooling required is a saw and burr-remover blades made inexpensively from spring steel. One dial, furnished as standard equipment feeds the above range of blank diameters. Special dials can be furnished for other blank diameters.

WATERBURY FARREL
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For further information, write for free bulletin or contact your nearest WF representative, today.

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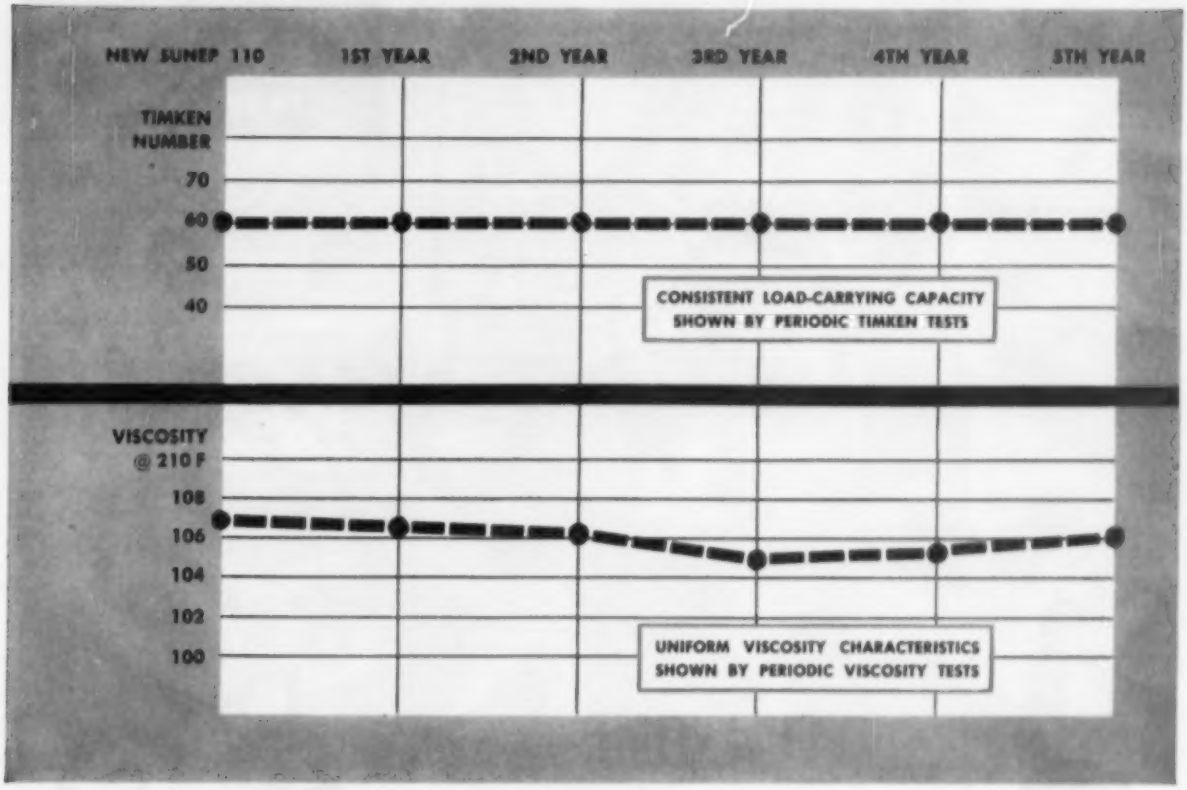
WATERBURY FOUNDED 1851 FARREL



Taken from the records of a major steel producer, the above graphs show the life record of a Sunep gear lubricant used in a 3-stand, 4-high cold-rolling mill. *With no make-up,* Sunep is as good as new after running more than 30,000 hours.

Steel company tests show:

SUNEP EXTREME-PRESSURE LUBRICANT REDUCES OIL AND MAINTENANCE COSTS

Sunep® lubricants help cut over-all oil costs because they have a long service life. They are made from high-quality base oils...unusual in the manufacture of extreme-pressure lubricants ...and because of this, are outstanding in their resistance to oxidation. They will not thicken or thin out in operation and will separate easily from water. Most important, they will last years longer than ordinary gear lubricants.

Sunep lubricants help keep maintenance down because they don't lose their e.p. qualities. They are specially blended to prevent "fall-out" of the extreme-pressure ingredients in service...a frequent and hidden cause of gear failure.

Sunep lubricants protect bearings and gears against rust and corrosion...an added help in reducing maintenance costs.

For more proof that Sunep and other Sun Products can benefit you, visit Sun's booths 118, 119 and 120 at the Iron and Steel Exposition, Cleveland Public Auditorium, September 25–28.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

PHILADELPHIA 3, PA.

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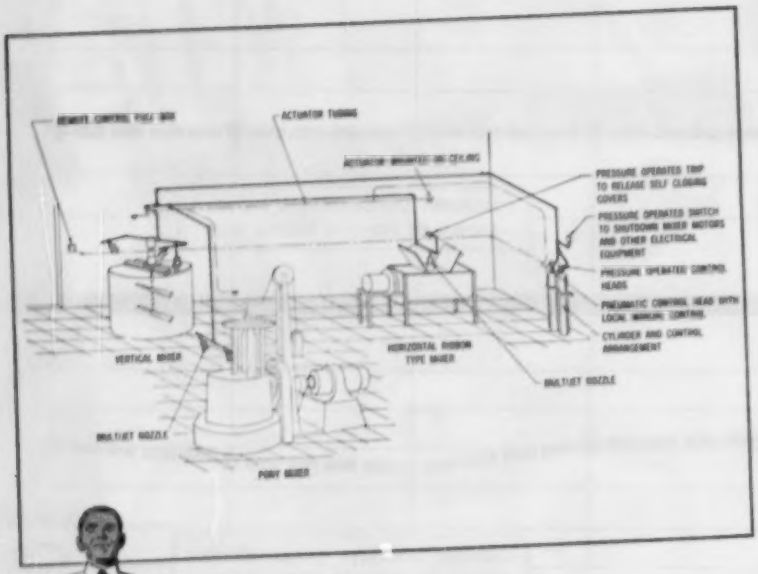
PRESSURE OPERATED TRIP TO RELEASE SELF CLOSING COVERS
PRESSURE OPERATED SWITCH TO SHUTDOWN MIXER MOTORS AND OTHER ELECTRICAL EQUIPMENT
PRESSURE OPERATED CONTROL HEADS
PNEUMATIC CONTROL HEAD WITH LOCAL MANUAL CONTROL
CYLINDER AND CONTROL ARRANGEMENT
VERTICAL MIXER
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MULTIJET NOZZLE
MULTIJET NOZZLE
PONY MIXER

FULL-TIME FIRE PROTECTION... CUSTOM-ENGINEERED FOR INDUSTRIAL MIXERS!

SPECIAL HAZARDS—like industrial mixing vats shown in the diagram above—deserve special fire protection . . . the *custom-engineered* kind of fire defense that you get with a Kidde CO_2 Fire Extinguishing System!

Fully automatic, the Kidde system provides *'round-the-clock* protection . . . insures full-time security even in case of outside power failures. Rate-of-temperature-rise detectors spot the first sign of flame, and cause Multijet nozzles to discharge fire-smothering carbon dioxide that stifles the blaze in seconds. At the same time, the Kidde system switches off fans and machinery and sounds an alarm.

All moving parts of a Kidde system are self-enclosed to prevent accidental discharge. Easy-to-read visual indicators show at a glance whether the system is "set" or "released." And Kidde Directional Valves let you guard more than one hazard from the same cylinder bank, providing completely versatile fire protection.

Don't settle for anything less than the *best* in fire protection. For more information about your specific problem, write Kidde today.

Kidde

Walter Kidde & Company, Inc.
960 Main Street, Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd., Montreal—Toronto

LETTERS TO THE EDITORS

Original Copy Passed Along

Please send an additional copy of the seventh Program for Management article, "To Merge or Not To Merge" (Aug. 13, page 89). I have turned over my copy of this excellent article to our company officials.

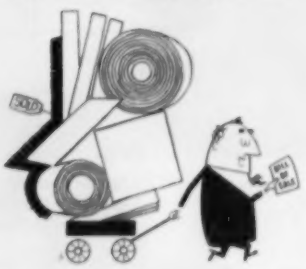
A. Vaughan Chinnock
Assistant Advertising Manager-Chemicals
Hooker Electrochemical Co.
Niagara Falls, N. Y.

More on Miniaturization

May I have a copy of the article, "Miniaturization Is Big Business" (July 23, page 78)? I liked it a lot. The exhibit, "Up and Down History of the Micro Switch" (page 81), was good, too.

Lonville Rogers
1307 Church Street
Galveston, Tex.

Analysis of Tough Situation



I have just finished reading your article, "Want To Be a Mill Customer?" (Aug. 20, page 76). To me, this is a fine analysis of a tough situation.

I feel that others in our organization should read it over and that we should have an extra copy for reference. Please forward two copies.

A. L. Weindorf
Assistant Purchasing Agent
American Sterilizer Co.
Erie, Pa.

We would like to commend you for your fine article. We would appreciate 10 copies.

James T. Hansen
Manager
C. T. Hansen & Co.
Seattle

Informative Article

I would appreciate a copy of the report, "Another Look at Nitriding." This informative article appeared on pages 134-140 of the August 20 issue.

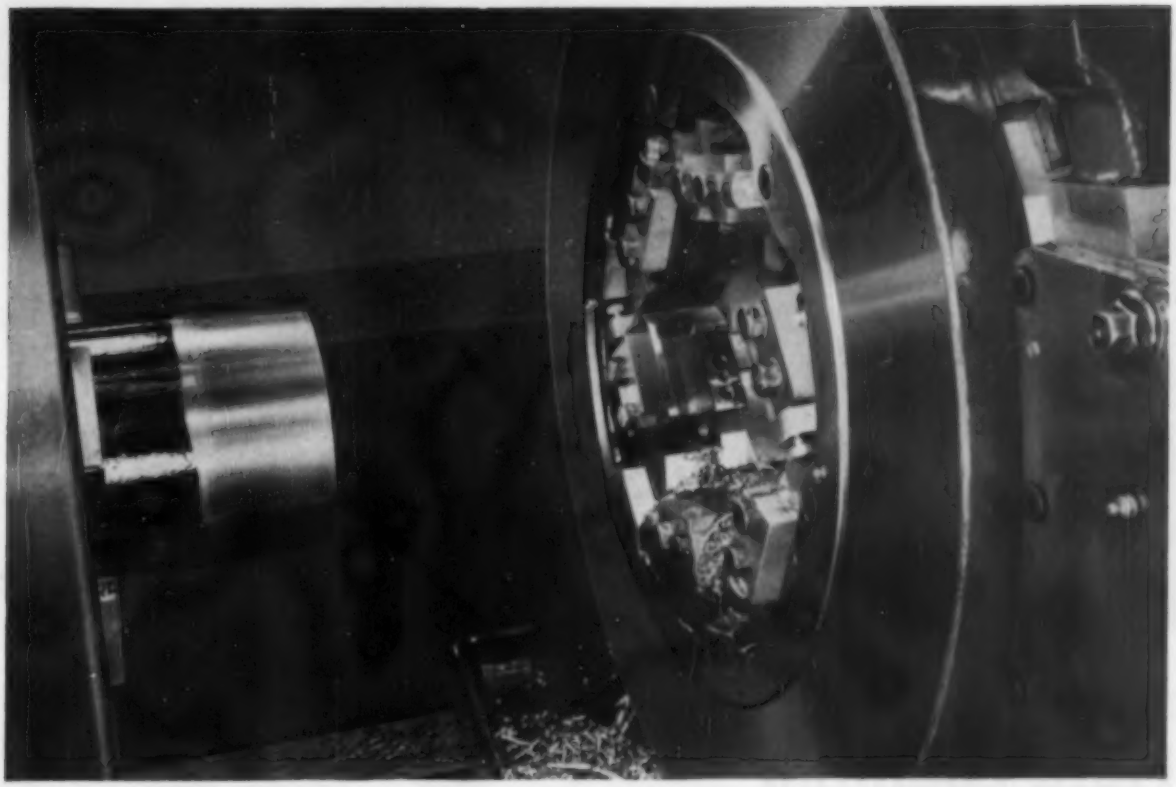
John H. Fuchsluger
Metallurgist
Metal Products Division
Koppers Company Inc.
Baltimore

Report Educates Staff

Thank you for the reprints of your Program for Management article, "Know Your Costs" (Mar. 19, page 83).

They were used to further educate our engineering, sales and operating departments on the value of "knowing our costs." I believe the article is helping to bring about greater co-operation with

(Please turn to page 12)



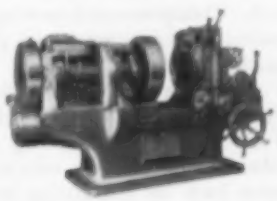
LARGE TEXAS SHOP USES LANDIS PIPE MACHINES *Exclusively . . . .*

TEN LANDIS Receding Chaser Pipe Threading Machines are used by Atlas Pipe, Inc., largest mill-type pipe finishers on the Gulf Coast, for threading oil tubular goods.

These machines are installed in an offset position so as to permit uninterrupted production. Typical production figures show: the 4¾" machines threading 74 joints (148 threads) per hour from 2⅜" upset tubing—the 8⅝" machines averaging 20 joints (40 threads) per hour from 5½" casing. All threads are 8 pitch to API standards.

Mr Becker, Plant Manager, highlights the important production advantages of LANDIS Pipe Machines when he says that they were selected for their flexibility, versatility, and the uniform threads produced. Thread uniformity is made possible by massive construction, leadscrew control of the carriage movement, a precision-built die head featuring LANDIS Tangential Chasers, and an attachment which mechanically controls the degree of taper.

These machines offer flexibility through wide range coverage—three sizes of machines (4¾", 8⅝", 13⅜") thread all pipe sizes from 1⅝" to 13⅜" Ease of set-up is also important — a change of diameter and length in less than two minutes, a complete change for diameter, pitch, taper, and length in 40 minutes.



LANDIS Receding Pipe Machines perform four other pipe fabricating operations in addition to threading: cutting off, chamfering, reaming, and the making and breaking of collars. For more information, write for Bulletin C-77.

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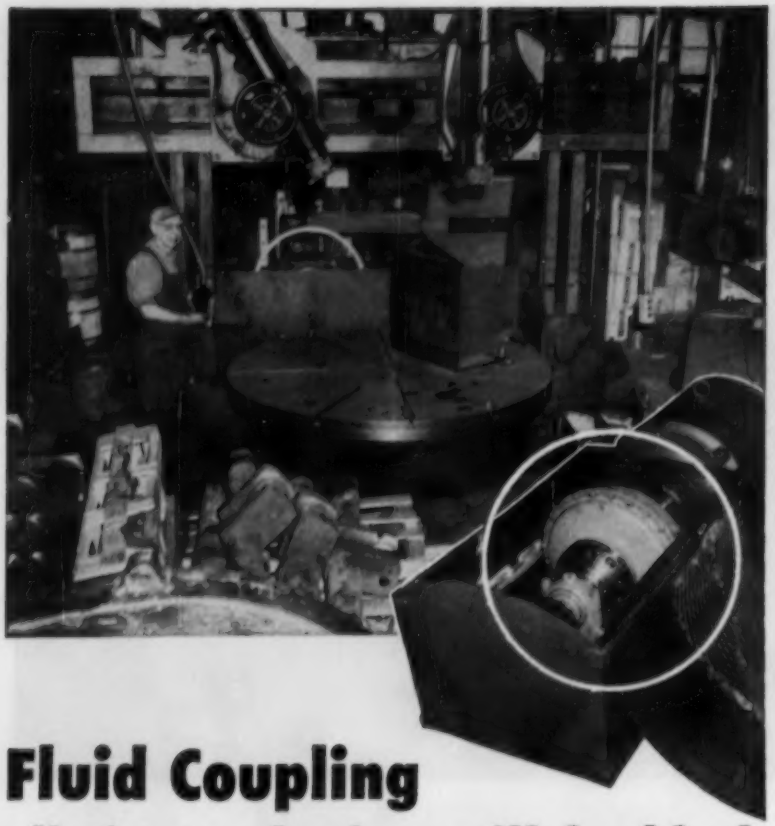
LANDIS *Machine* COMPANY · WAYNESBORO PENNSYLVANIA

THE WORLD'S LARGEST MANUFACTURERS OF THREAD GENERATING EQUIPMENT



Fluid Coupling
eliminates boring mill backlash

To *eliminate* blacklash, and to obtain *maximum performance* from a boring mill, Doelger & Kirsten, Inc., Milwaukee, Wis., installed a Twin Disc Model HCM Fluid Coupling between a 25 horsepower motor and the machine.

Prior to this installation, the company had never obtained maximum use of the machine because of backlash. This prevented making maximum cuts at maximum feed, thus impairing the finish.

According to William Reichert, Plant Foreman, "Since installing the Twin Disc Fluid Coupling, we can take extremely heavy cuts at maximum feed. By eliminating backlash, an excellent finish is assured." In summarizing the advantages gained by this installation, Reichert indicated: (1) Inching facilities now extremely good. (2) Gear-teeth chatter has been eliminated. (3) Forward and reverse of motor is no longer a problem. (4) The conversion was economical.

If *your* operation calls for a smooth, cushioned, steady flow of power . . . no motor or engine lugging, stalling or burning out on heavy starts . . . output torque equal to input torque . . . get complete information *now*, about Twin Disc Fluid Couplings—offered in a wide variety of sizes, for any motor or engine application from ¾ to 850 hp. Write Twin Disc Clutch Company, Dept. DS, Racine, Wis. Request Bulletins 144-D and 145-C.

TWIN DISC

TWIN DISC
Fluid Couplings

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC Division, Rockford

Branches or Sales Engineering Offices: Cleveland • Dallas • Detroit • Los Angeles • Newark • New Orleans • Tulsa

LETTERS

(Concluded from page 10)

my department through a better understanding of what we are trying to accomplish.

Robert S. Daniels
Controller
Morgan Bros. Co.
Pittsburgh

Cut Down Absenteeism

Please send a copy of the article, "How To Cut Absenteeism" (Aug. 27, page 58).

Edwin A. Benz
Secretary-Treasurer
Fort Wayne Structural Steel Co.
Ft. Wayne, Ind.

Prevent Rust Formation

We would appreciate the name and address of the container manufacturer referred to in the item, "Guards Against Rust," in the Technical Outlook column of June 11 (page 111). The item deals with the VCI powder which will prevent rust formation on the inside of empty steel drums and pails for at least a year.

C. Gonzalo
Fabricacion de Envases Metalicos S.A.
Madrid, Spain

• *For this information, contact Daubert Chemical Co., 333 N. Michigan Ave., Chicago 1, Ill.*

Move to the Suburbs

We are most interested in obtaining a copy of the article, "Planning a Suburban Plant." It appeared in your Aug. 20 issue on pages 84 and 85.

Gerald C. Long
Wolfe Products Inc.
Akron

Article To Be Reprinted

We have read with interest the article, "Engineering Unions Grow" (Aug. 13, page 53). May we have your permission to reprint this article in our monthly publication, the *Southern California Professional Engineer.*

D. W. Bryant
Executive Editor
Southern California Professional
Engineering Association
Los Angeles

• *Permission granted.*

Re-Usable Dies of Copper

We would appreciate receiving a copy of the article, "Beryllium-Copper Dies" (July 30, page 116).

Walter H. Gilbert
Lake Erie Engineering Corp.
Buffalo

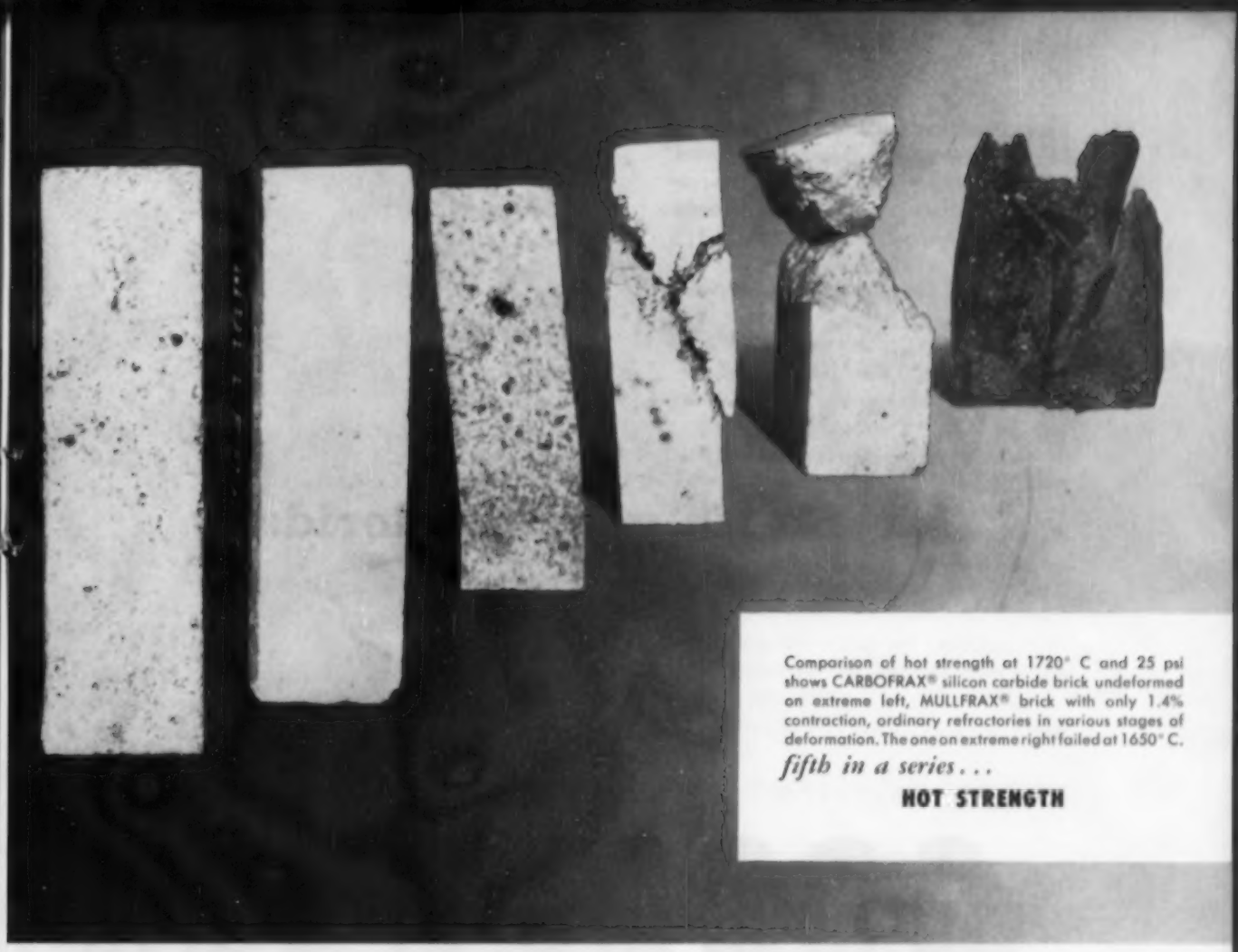
Search for Right Man

In the article, "Top Jobs Go Begging" (May 14, page 69), you state: Many companies enlist the aid of management consultants. At least 15 of these (most of them are in New York) do a big business in top talent.

I would appreciate the names of these consultants.

G. H. de Reus
Salem Depot, N. H.

• *There are so many management consultants that it is difficult to give you a list of the 15 that do the biggest business. We suggest you check with the Association of Consulting Management Engineers, 347 Madison Ave., New York 17, N. Y.*



Comparison of hot strength at 1720° C and 25 psi shows CARBOFRAX® silicon carbide brick undeformed on extreme left, MULLFRAX® brick with only 1.4% contraction, ordinary refractories in various stages of deformation. The one on extreme right failed at 1650° C.

fifth in a series . . .

HOT STRENGTH

Unusual Properties of Refractory Materials

Hot Strength—When load is applied to a refractory its ability to resist heat is lessened. Increasing either load or temperature, or both, often causes the refractory to fail.

As these factors are combined in most installations — large and small — hot strength of a refractory takes on new value.

The effect of temperature in combination with load is shown by specimens pictured above. Further tests provided these data: In a test under 50 psi, a MULLFRAX® electric furnace mullite brick showed no linear contraction when held at 1500°C for 100 hours. Ordinary brick contracted an average of 7.58% at 1500°C but that at only 35 psi. In another typical case complete failure (15% contraction) was experienced with a commonly-used refractory at 1350°C and a load of 25 psi.

These differences in hot strength prove this: Where refractories fail under load and temperature, Carborundum refractories have the *extra* resistance needed to avoid slumping and, thereby, to effect less downtime, lowered maintenance costs and greater output.

Hot strength may work in another way, too. It permits use of thinner section refractories, thus reducing overall load. More insulation may be used to lower heat losses.

Carborundum's magazine "Refractories" pinpoints many practical applications for these unusual products. The next issue carries a feature article on "hot strength". Send for your copy today.

CARBORUNDUM

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VALUABLE INFORMATION FOR USERS OF:

REFRACTORIES • CASTABLE CEMENTS • POROUS PLATES AND TUBES

CATALYST SUPPORTS • OXIDE, BORIDE, NITRIDE AND CARBIDE

HIGH-TEMPERATURE MATERIALS • CERAMIC FIBER

all in the new magazine "Refractories"

—MAIL THIS COUPON TODAY—

Dept. W96, Refractories Division
The Carborundum Company, Perth Amboy, N. J.

Please send me the forthcoming issue of "Refractories".

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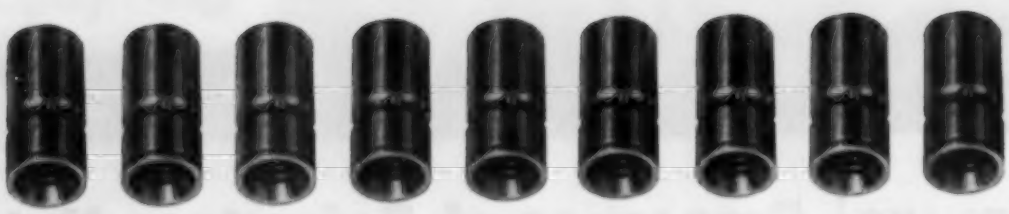
Mr. Smith goes to Florida!



Mr. Smith's books showed an excellent current ratio. His cash position was good; his surplus was substantial. Shortly thereafter, however, he entered a premature retirement.

He had overlooked the fact that a large part of his company's fixed assets were machine tools, and their values shown on his balance sheet were simply bookkeeping entries. Those values didn't reflect obsolescence, nor show how expensive indirect labor, nonproductive floor space and downtime can be.

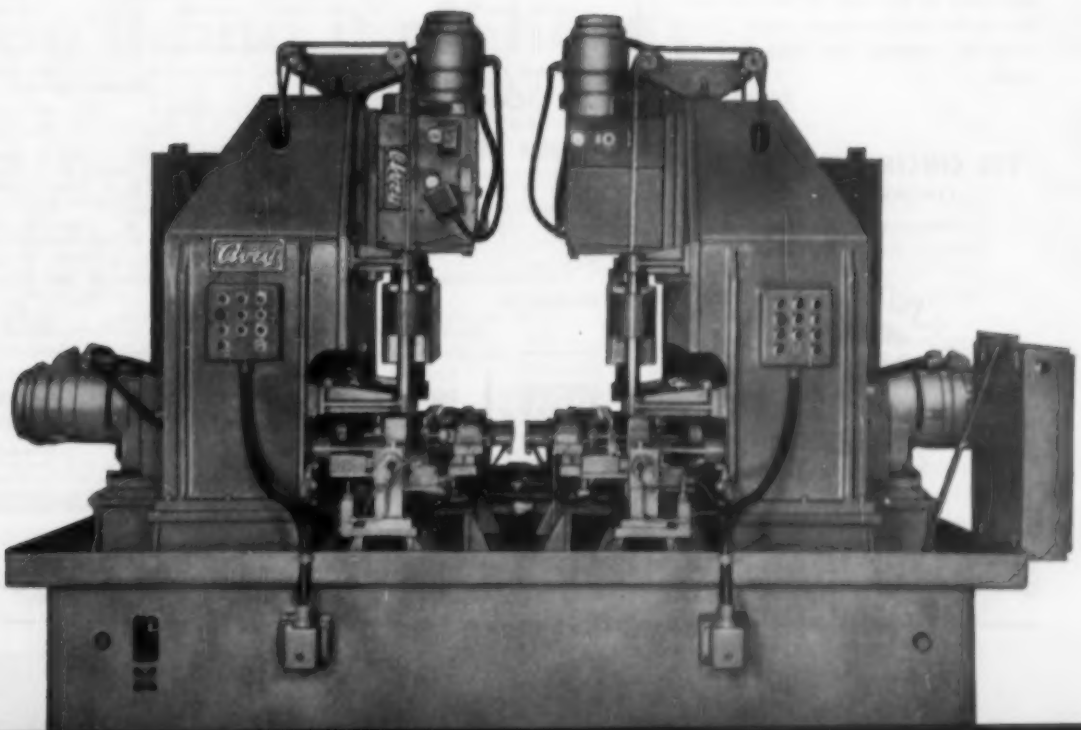
A closer look at your balance sheet may reveal the wisdom of investing in new production equipment. Its high rate of return makes good balance sheets better.

▸ **production data:** —This Avey Line-O-Dex drills and deburrs 3100 body sleeves per hour. On each half of machine, 3 parts at a time are indexed automatically; hydraulically clamped; drilled and deburred. Built to JIC specs except for 2-speed motors, which increase production.

THE AVEY DRILLING MACHINE CO., CINCINNATI 1, OHIO

drilling, tapping, production machines

Avey



PERFORMANCE
Makes Gears
EASIER TO SELL

REPRESENTATIVE, THE CINCINNATI GEAR CO.

Often when calling on a new customer *after* his first gear order has been assembled and is in test operation, he will tell me something like "finest gears we ever used — certainly improved operating qualities of our product — no trouble in assembly, no vibration, they are as quiet as a precision watch". This customer is just learning what Cincinnati Gear's older customers already know, and what I've known for the thirteen years I've represented Cincinnati Gear in the Cleveland area: that we make *ONLY GOOD GEARS* — gears that give 100% performance at all times. If, by chance, there is an error, there is never a compromise; the gear is promptly replaced.

This pleases our customers, of course, but *it* also pleases *me* — and gives me the confidence in our firm and our product that I need to do a first-rate selling job. This confidence, I feel, is about the most valuable "sales aid" I have. I can solicit an order and know full well that the gears shipped will deliver performance desired — and result in the kind of customer satisfaction that leads to repeat orders. I can't think of anything that makes my job easier.

THE CINCINNATI GEAR CO.
CINCINNATI 27, OHIO
"Gears—Good Gears Only"

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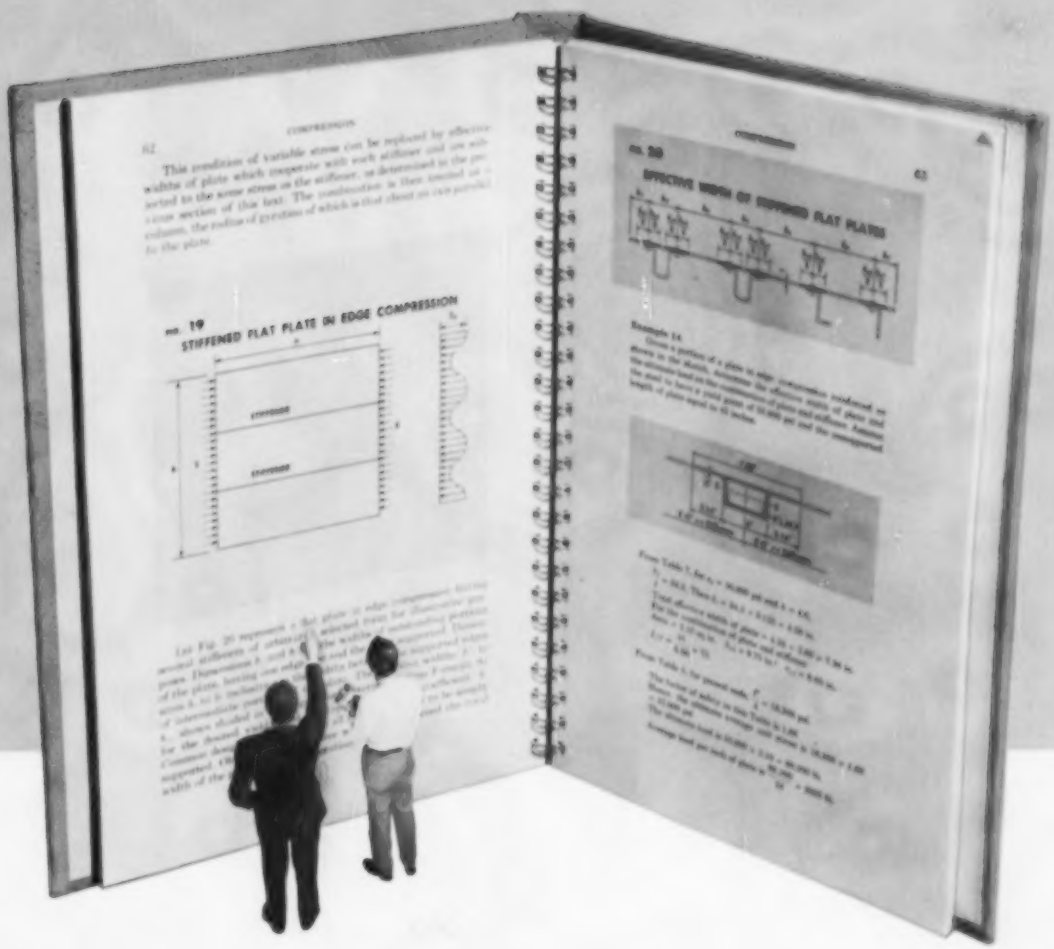

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The information you need when designing for high strength steels

OUR new "Design Manual for High Strength Steels" is ready for distribution. Here are 174 pages of practical, authoritative information that you will find invaluable in designing your product for greater economy and efficiency by the sound use of high strength steels. No designer should be without it.

This excellent book covers in detail the problems of tension, compression, shear, beam stress, deformation and deflection. It fully describes the fundamental characteristics of low-alloy high strength steels, shows you how to design against corrosion, describes the application of formed sections. Complete with tables, formulas, and basic data covering this important field of design.

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For your free copy, write on your company letterhead, giving your title or department, to United States Steel Corporation, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

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USS HIGH STRENGTH STEELS

USS MAN-TEN • USS COR-TEN • USS TRI-TEN

USS

UNITED STATES STEEL

Roll is shown at Homestead Forgings Division of United States Steel being bored, prior to heat treatment and reaming. Machine is 48" center drive, double end boring lathe.

Glass melting tank is at left. Forged Stainless rolls squeeze the viscous glass between them before it enters annealing lehr. ♥

PG rolls glass at 2000°F with USS Stainless Steel rolls

In a sizzling race to keep up with the demand for flat glass, Pittsburgh Plate Glass Company is rapidly building new factories and increasing the output of old ones. But you cannot increase the output of an existing factory unless you can somehow get more glass from the melting tanks.

Since plate glass must pass between a pair of rolls as it emerges from the tank, the rolls must turn faster when production is increased. If they turn faster, it is more difficult to dissipate the heat from the molten glass. The answer is better rolls. And when you're thinking in terms of better rolls for hot work, stainless steel forgings are the answer.

Pittsburgh Plate has found that USS Quality Forging rolls have suitable physical properties and microstructure that are so necessary for this job. They are made from Type 410 Stainless Steel, and are remarkably resistant to surface cracking and checking. The rolls are water cooled internally, and there is naturally a steep temperature gradient from O.D. to I.D. The forged rolls resist pitting and oxidation. They retain their dimensions during the 24-hour-a-day glassmaking process.

Pittsburgh Plate has had one set of these rolls in continuous service for two years, and they have already produced *millions* of square feet of glass. Similar rolls will also be installed in their revolutionary new Cumberland, Md. plant.

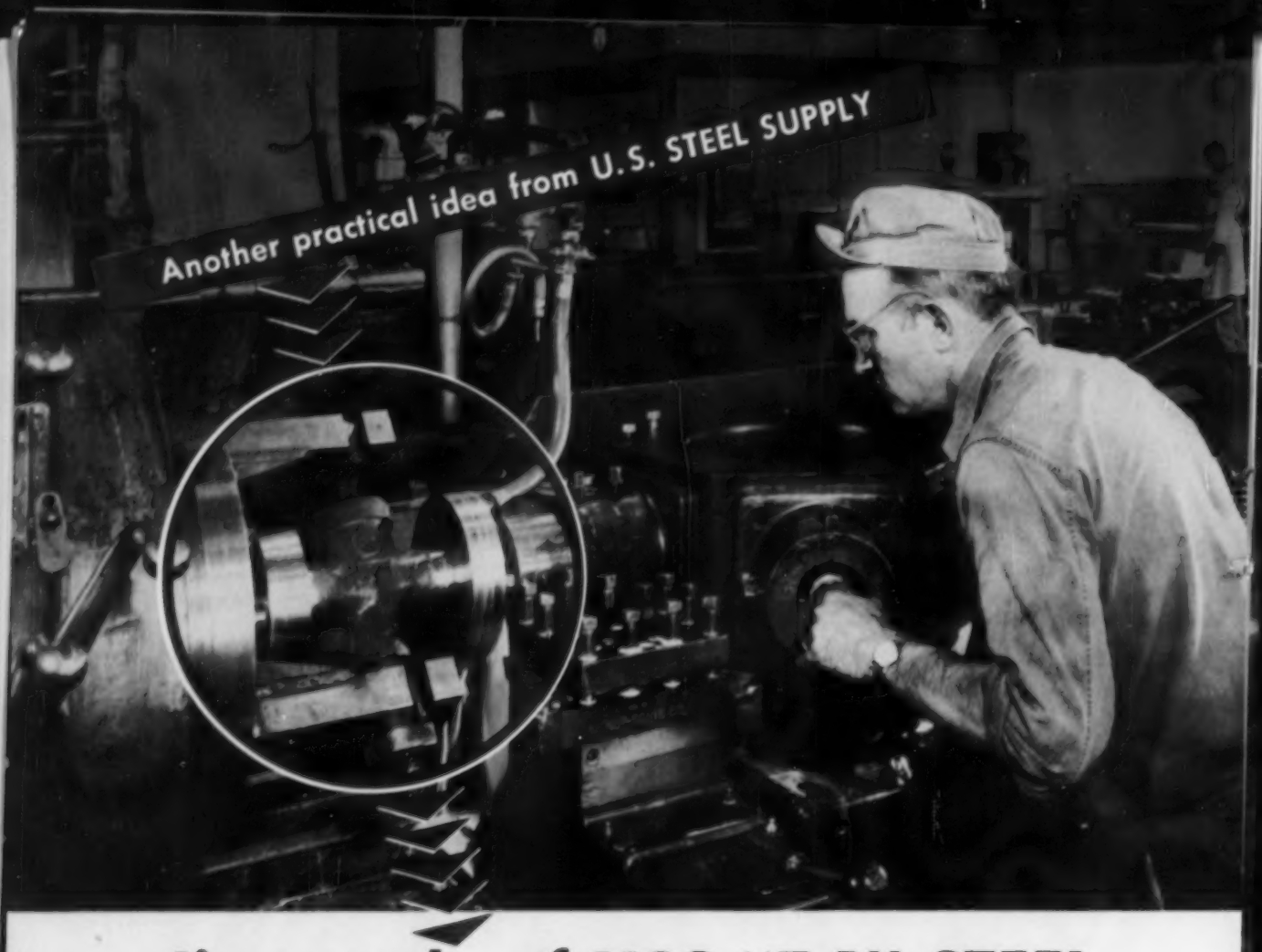
Write today for our free booklet that describes USS Quality Forgings. Address inquiries or requests for the booklet to United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

USS QUALITY FORGINGS

USS

heavy machinery parts—carbon, alloy, stainless
forged steel rolls and back-up roll sleeves
electrical and water wheel shafts
specialty forgings of all types

UNITED STATES STEEL



Jigs made of USS "T-1" STEEL

stand up best under gruelling turret lathe service!

Ever since the development and introduction of USS "T-1" steel, a number of interesting new applications of this strong, tough, readily weldable material have come to our attention. One of the most recent is its use by the A-1 Bit and Tool Company of Houston, Texas, for jigs on turret lathes. This company makes valves used to limit pressures in oil and gas lines. Here is what they say about their experience with USS "T-1" steel:

"In the past, when making jigs or fixtures, we had to make the parts, dowel and screw them together. The various parts had to be made of heat treated material or hardened before assembly to prevent warpage. All of which we found to be a slow and expensive process.

"Your new USS "T-1" steel has practically worked a revolution in A-1's jig and fixture design, because we can now machine the parts complete, weld them together, mount the jig on the machine and use it, as we find warpage in welding to be negligible."

Perhaps you, too, can switch to USS "T-1" steel with equally satisfying time- and money-saving results. Why not talk to your U. S. STEEL SUPPLY salesman about the possibilities of using USS "T-1" steel in your shop. Or, if you will write to our Chicago headquarters, we will be glad to send you a free booklet giving the full story of this new steel.

• • •

If your shop has a welding, cutting, machining or abrasion problem, U. S STEEL SUPPLY *can definitely help you solve it . . . and fast! We have the right steel for your job.*

U.S. STEEL SUPPLY

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General Offices: **208 So. La Salle St., Chicago 4, Ill.** **Warehouses and Sales Offices Coast to Coast**

UNITED STATES STEEL

(Advertisement)

Projection Welding

How to Use It to Help Put the Profits Back into Manufacturing

What is Projection Welding?

Projection welding is a resistance welding process for joining flat or shaped pieces of metal. The two work pieces generally are clamped under electrodes of considerable area that are either flat or made to fit the work. Formed projections or embossments are processed on one of the pieces before welding. Pressure is applied and the current divides equally among the projections and produces welds of approximate equal strength. The heating and pressure process continues until the projections or embossments are flattened sufficiently to bring the work pieces against each other.

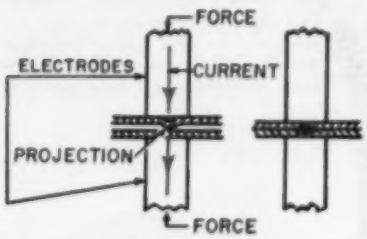


Fig. 1 Projection welding process.

Advantages of Projection Welding

A projection resistance weld requires no additional metal, arcs, gas or flame. *The weld is within the materials themselves*—and is as strong, if not stronger than the parent metals. It offers a 100% strength factor compared to 80% for arc or flame welds.

The simplicity of a resistance welding operation often reduces multi-step fastening operations and enables unskilled operators to produce consistent, high quality welds at peak production.

Many products that were not originally designed for resistance welding can easily be adapted with simple tooling. Costly jigs and fixtures can be eliminated too, because Sciaky resistance welding techniques practically eliminate warpage and distortion of work pieces.

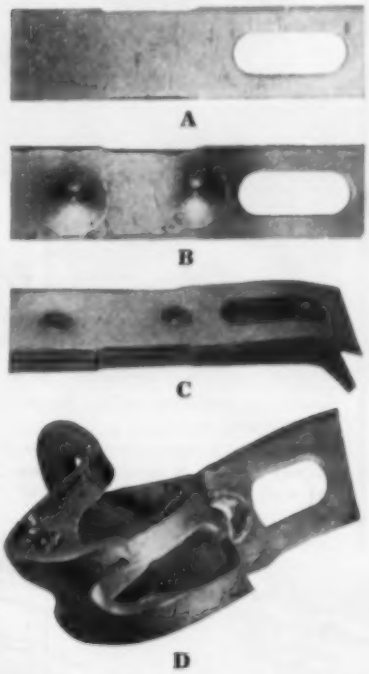


Fig. 2 A. & B. Phosphor bronze clips. Each is .020" thick and has been first silver, then gold plated. C. The welded part. D. The destruction test. Note the high strength bond and complete nugget separation from parent metal.

When to Use Projection Welding

As a rule, this application is done in multiple projections simultaneously and also, this technique is very useful where several welds are to be made in a small area. It is often used to attach brackets or fasteners, or to join metal parts having machined projections. Metals of light thickness may be welded to heavy thicknesses. However, various metals do present problems, but with properly applied Sciaky techniques, metals such as aluminum and bronze are readily and effectively projection welded. Note Fig. 2—A, B, C and D.

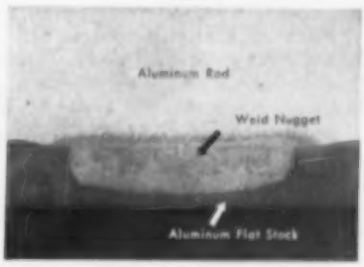


Fig. 3 Macrograph of all aluminum projection weld joining a rod to .062" flat stock.

Sciaky Research Center

Sciaky's new Research Center invites you to submit your metal fastening problems. This entire facility, with the latest resistance welding machines, testing instruments, and trained personnel is devoted to solving your joining problems and advancing the application and development of resistance welding.

Write Today for Free Sciaky Literature

Start to build your data file on resistance welding today. Our "Resistance Welding at Work" publication, Vol. 3, No. 2 and Vol. 4, No. 1, contains case histories of Sciaky projection welding techniques. Designers' Guide Bulletin 331 discusses projection welding and other forms of resistance welding.

Describe your particular fastening problem on company letterhead and we will send suitable back and future issues of our "RWAW" publication. All contain impressive examples of Sciaky's basic thinking—resistance welding techniques designed to put the profits back into manufacturing.

Largest Manufacturers of Resistance Welding Machines in the World

SCIAKY

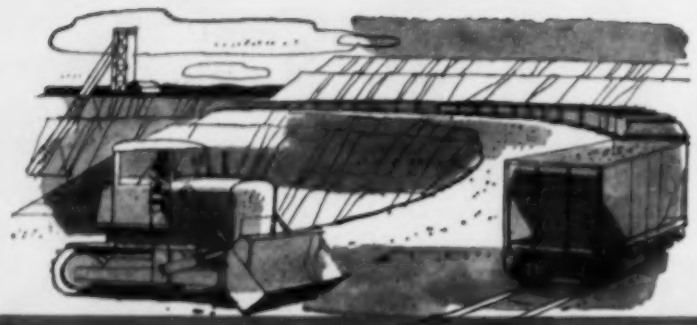
Sciaky Bros., Inc., 4909 West 67th Street, Chicago 38, Ill., Portsmouth 7-5600

From Mine to Mill . . .

Allis-Chalmers Equipment serves in every part of the Steel Industry . . . Dependably, Economically

For more than three quarters of a century, Allis-Chalmers has served the steel industry — supplying the equipment needed to produce top quality steel . . . the manufacturing "know-how" to meet heavy-duty operating conditions . . . the pioneering spirit to keep up with the changing requirements of the industry. Allis-Chalmers machines are employed, not just in one phase, but all through the steel-making process. For complete information on how Allis-Chalmers can help solve your machinery problems, consult your Allis-Chalmers district office or write Allis-Chalmers, Milwaukee 1, Wis.

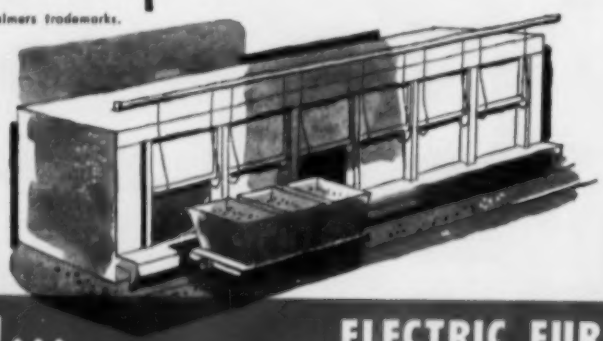
Regulex and *Texrope* are Allis-Chalmers trademarks.

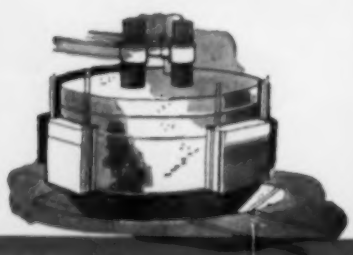


MINES . . .

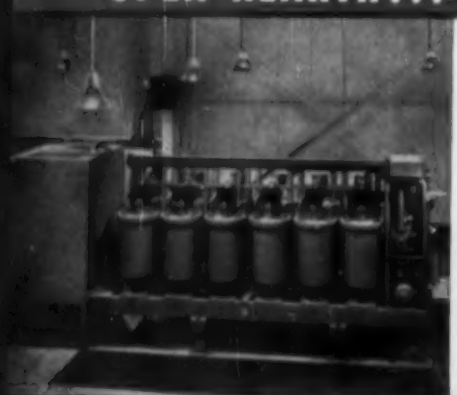
Crushers, grinding mills, vibrating screens engineered and manufactured by Allis-Chalmers crush the ore-bearing rock, grind it to specified size, size and wash metallic ores, stone and coal.

Allis-Chalmers pumps, motors, *Texrope* drives are in wide use throughout the metal industry because of their long life characteristics, low maintenance requirements and great versatility.





OPEN HEARTH . . . ELECTRIC FURNACE . . .



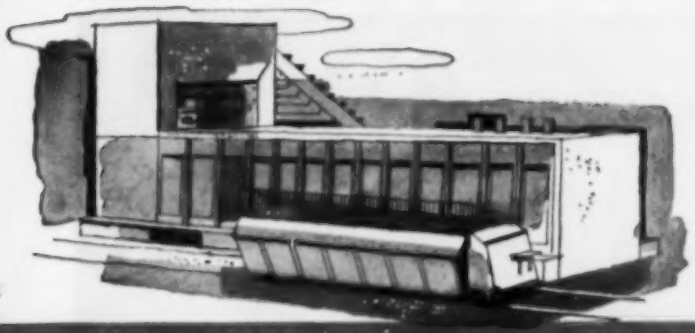
Mercury-arc rectifiers furnish constant voltage dc power for material handling in open hearth and other mill operations and for mine haulage. Variable voltage units are supplied for supporting main roll drives.

Allis-Chalmers arc furnace transformers are of well-balanced design and extra heavy duty construction — proven in 25-30 years of repeated daily short-circuits in electric furnace operation.

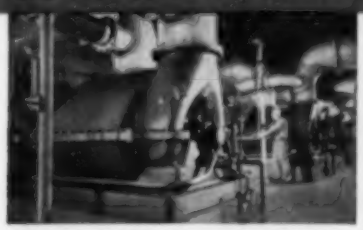
***Regulex* control** balances arc current with arc voltage, almost instantly — maintains desired arc condition automatically.

ALLIS-

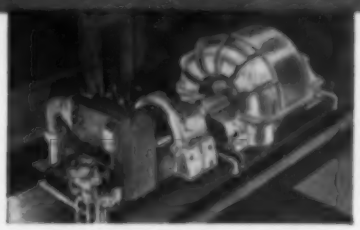
. . . It's Allis-Chalmers



COKE OVEN... BLAST FURNACE...

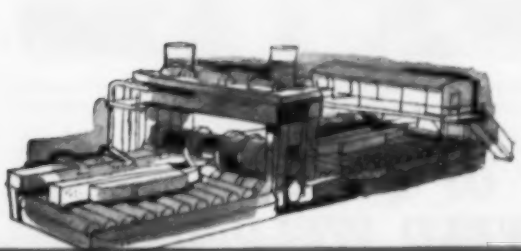


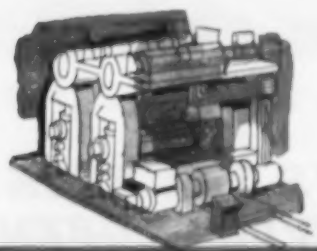
Booster, exhauster or combination service requirements are met by Allis-Chalmers blowers. Photo shows four 23,000-cfm, 5100-rpm, 3.5-psig centrifugal exhausting blowers in a western steel mill.



Blast furnace blowers furnished by Allis-Chalmers meet blast furnace requirements. The 75,000-cfm, 30-psig centrifugal blower shown here has been in service since 1942. It is driven by an 8500-hp steam turbine.

Allis-Chalmers axial blowers are designed for high efficiency blast furnace duty. They are smaller, easier to install — save $50,000 or more in steam per year. A-C also builds constant efficiency rotary compressors.





BLOOMING MILL... FINISHING MILLS...

Motor room photograph shows Allis-Chalmers switchgear, control, constant and variable voltage motor-generator sets, *Regulex* m-g sets, liquid rheostat, and twin-drive motors in use in a midwestern steel plant.

Hot strip, cold reduction, temper, rod and wire mills, and annealing and pickling lines employ Allis-Chalmers control, power equipment and drive motors for dependable operation.

Other Equipment

Besides the power utilization and conversion equipment illustrated, Allis-Chalmers also supplies power generation and distribution requirements from mine to mill.

For power generation, A-C builds steam turbine-generator units, surface condensers, water conditioning equipment, pumps, motors, and control. Also hydraulic turbines, generators, governors, and valves. For power distribution, A-C furnishes transformers, voltage regulators, circuit breakers, switchgear, and substations.

Throughout this wide range of products, you can depend on Allis-Chalmers for equipment engineered to meet your exact needs.

CHALMERS

A-4907

WELDMENTS for strength, lightness, predictability and design freedom—at lower cost!

DIESEL ENGINE FRAME: Weldments of this type have been responsible for weight savings as high as 32% with no sacrifice in strength and safety. Superior shock resistance protects engine performance. Maintenance costs are reduced and significant economies realized.

HERE'S THE STORY OF QUALITY BEHIND EVERY LUKENWELD WELDMENT

Lukenweld's extensive production facilities and experience add up to this: no matter how big, tough, or challenging the job, you get exactly what you want—on time—and at a cost that will fit your plans.

DEPENDABILITY The predictability and rigidity of welded structures plus Lukenweld's specialized knowledge of design and materials selection assures equipment that will perform efficiently, longer.

RELIABLE SOURCE OF MATERIALS Carbon, alloy and clad steel plates in the widest range of types and sizes available anywhere are obtainable "right next door"—from the Lukens rolling mills.

CONSULTATION SERVICE Metallurgical, design engineering, related services are available on your job.

FINISHING FACILITIES Modern heat treating, machining and other finishing facilities are your assurance of complete quality control from steel plate to finished weldment—ready for assembly in your equipment.

EXPERIENCE Lukenweld, the first commercial weldery in the U.S., pioneered many advances in welded construction. Knowledge and craftsmanship gained through this experience make Lukenweld unusually qualified to meet your weldment needs.

FOR INFORMATION on how Lukenweld can answer your particular weldment problems or for a copy of the informative booklet, "Weldments by Lukenweld," write on your company letterhead to Manager, Marketing Service, 819 Lukens Building, Coatesville, Pa.

LUKENWELD LUKENS

A DIVISION OF LUKENS STEEL COMPANY
COATESVILLE, PENNSYLVANIA

From Small Fasteners, Mighty Products Grow

Fasteners are a small but exceedingly important component of most assembled products. So important, in fact, that they make dreams become reality and ideas tangible.

For 90 years, Lamson-manufactured bolts, nuts and screws have played a major role on the drawing boards and the assembly lines of industry. Constant research and progressive engineering have kept Lamson fasteners abreast of the growing demand for "better ways to put products together".

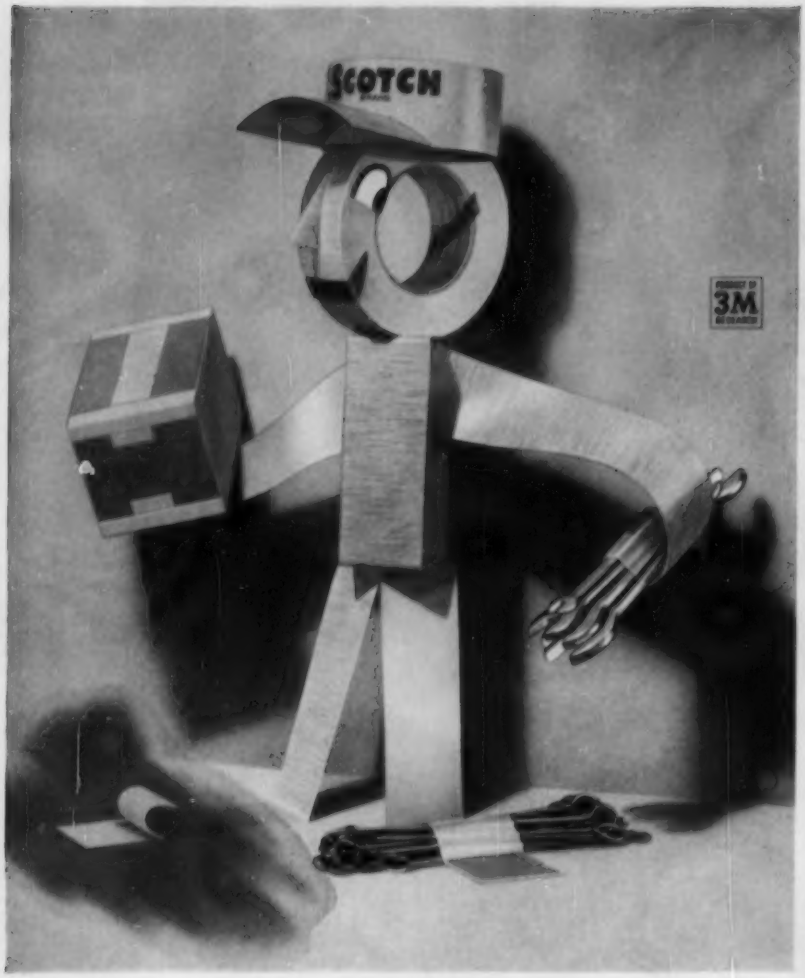
Behind every bolt, nut and screw is a dependable "Statistical Quality Control" inspection system. This assurance of quality keeps assembly lines running and saves you time, money and trouble.

These are only a few of the many reasons why your product will be a *better* product if it's fastened by Lamson & Sessions!

The LAMSON & SESSIONS Co.

1971 West 85th Street • Cleveland 2, Ohio

PLANTS AT CLEVELAND AND KENT, OHIO • BIRMINGHAM • CHICAGO



All-around tape helper in the new "RAK-A-TAPE" carton!

Now "SCOTCH" Brand Masking Tape is packaged in a *new carton* that's easier to handle... easier to stack... easier to open. Provides easy tape accessibility and dust-proof closure for trouble-free storage. Tape is packed in 4 individual wall-hanger type racks.

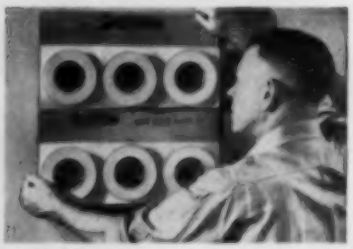
MASKING TAPE ... *one of more than 300 pressure-sensitive tapes for industry, trademarked...*

REG. U.S. PAT. OFF.

SCOTCH
BRAND

Look what you can do with it!

NEW TEAR-STRIP FEATURE lets you z-i-p open the carton and remove the tape—fast. No wasted time. "Hinged" top keeps out dust and dirt when tape is stored in opened carton.



NEW "RAK-A-TAPE" WALL HANGER (4 in each carton) puts individual rolls of "SCOTCH" Brand Masking Tape up on the wall – out of the way. Keeps tape handy, free from dirt.

NEW PLAID CORE provides quick identification for the *quality* tape that sticks at a touch. Always specify "SCOTCH" Brand, *the brand with the plaid* . . . and stick with it!

FREE FOLDER shows dozens of ways you can cut costs using "SCOTCH" Brand Masking Tapes. Write on your letterhead to 3M Co., St. Paul 6, Minn., Dept. GK-96.

The term "SCOTCH" is a registered trademark of Minnesota Mining and Manufacturing Company, St. Paul 6, Minn. Export Sales Office: 99 Park Ave., New York 16, N.Y. In Canada: P.O. Box 757, London, Ontario.

CALENDAR
OF MEETINGS

Sept. 10-12, Allied Railway Supply Association: Annual meeting, Sherman hotel, Chicago. Association's address: 1200 W. Chase Ave., Chicago 26, Ill. Executive secretary: Charles F. Weil.

Sept. 10-12, American Society of Mechanical Engineers: Fall meeting, Cosmopolitan hotel, Denver. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Sept. 10-12, Packaging Institute: Annual forum, Hotel Statler, Cleveland. Institute's address: 342 Madison Ave., New York 17, N. Y. Executive director: Charles A. Feld.

Sept. 10-13, Society of Automotive Engineers Inc.: National tractor meeting and production forum, Hotel Schroeder, Milwaukee. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Sept. 11-13, American Die Casting Institute: Annual meeting, Edgewater Beach hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N. Y. Secretary: David Laine.

Sept. 11-14, Packaging Machinery Manufacturers Institute: Packaging machinery and material exposition, Public Auditorium, Cleveland. Information: Hanson & Shea Inc., One Gateway Center, Pittsburgh 22, Pa.

Sept. 13-14, Porcelain Enamel Institute: Annual meeting, Broadmoor hotel, Colorado Springs, Colo. Institute's address: 1145 19th St. N. W., Washington 6, D. C. Secretary: John C. Oliver.

Sept. 16-20, American Society of Sanitary Engineering: Annual meeting, Morrison hotel, Chicago. Society's address: 4716 Ewing Ave. S., Minneapolis. Secretary: Walter A. Dunn.

Sept. 16-21, American Chemical Society: Annual meeting, Convention Hall, Atlantic City, N. J. Society's address: 1155 16th St. N. W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Sept. 17-21, American Society for Testing Materials: Pacific area national meeting and apparatus exhibit, Hotel Statler, Los Angeles. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Robert J. Painter.

Sept. 17-21, Instrument Society of America: Annual instrument-automation conference and exhibit, Coliseum, New York. Society's address: 1319 Allegheny Ave., Pittsburgh 33, Pa. Executive director: William H. Kushnick.

Sept. 20-21, American Hot Dip Galvanizers Association: Semiannual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: 1806 First National Bank Bldg., Pittsburgh 22, Pa. Secretary: Stuart J. Swensson.

Sept. 21, Malleable Founders' Society: Fall meeting, Hotel Cleveland, Cleveland. Society's address: Union Commerce Bldg., Cleveland 14, O. Managing director: Lowell D. Ryan.

Sept. 24-25, Steel Founders' Society of America: Fall meeting, Greenbrier, White Sulphur Springs, W. Va. Society's address: 606 Terminal Tower, Cleveland 13, O. Executive vice president: F. Kermit Donaldson.

Sept. 24-28, Trade Fair of the Atomic Industry: Navy Pier, Chicago. Information: Trade Fair Department, Atomic Industrial Forum, 260 Madison Ave., New York 16, N. Y.

This prominent machine tool manufacturer has fully conveyorized assembly operations with Logan Conveyors. Here, machined castings start in foreground, and gearing sub-assemblies, electrical parts and other accessories are added as unit progresses toward rear. Part of an extensive multi-floor system.

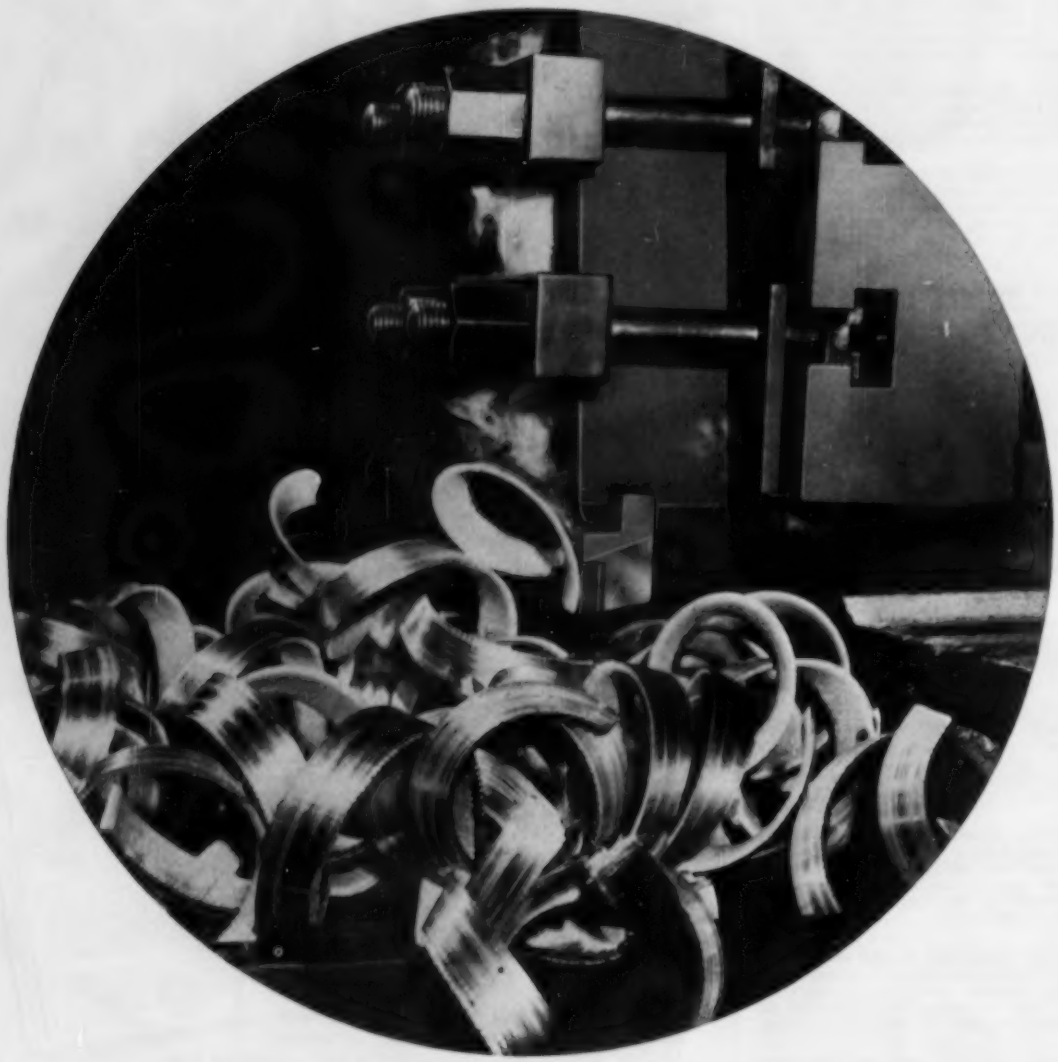
The LEADERS use Logan

"Hitch your wagon to a star" is a philosophy which helps to make our industrial leaders. Part of this philosophy is the exercise of care in the selection of vital plant machinery such as conveying equipment. In thousands of successful establishments Logan Conveyors speed output, increase capacity in the same plant, conserve manpower, make satisfied employees. Logan can serve you, too. Write for further information or for nearest engineer to call.

LOGAN CO., 535 CABEL ST., LOUISVILLE 6, KY.

Logan Conveyors

speeds for carbides **plus** heavy-cut efficiency



low range to 100 fpm . . . for extreme depths of cut and maximum feeds

medium range to 150 fpm . . . for average cuts in medium steel or cast iron

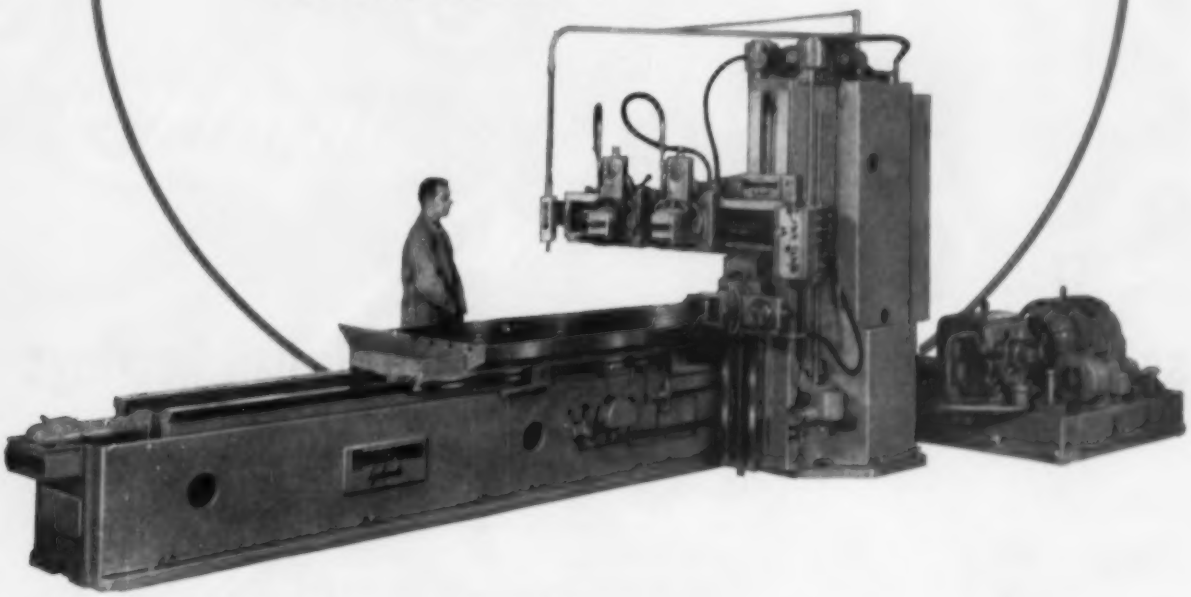
high range to 300 fpm . . . for carbide planing of steel and non-ferrous metals

with triple circuit h3 drive

The new heavy duty Model OGN Hydraulic Shaper-Planers are equipped with triple circuit h3 drive to combine the ruggedness and cutting efficiency of single circuit planers, with the speeds required for carbide planing. Three distinct ranges of cutting speed are provided, with power inversely proportional, to give the correct combination of speed and force to most economically machine any metal.

Hydraulic drive is ideally suited for carbide tooling, since optimum cutting speeds can instantly be set for any tool. Tools also enter the cut more smoothly with hydraulic drive to reduce the tendency for fracturing brittle carbide tips.

A Rockford Machine Tool Co. representative can demonstrate these advantages for you. Ask your local dealer for full details, or write us for a copy of Bulletin No. 1200.



ROCKFORD MACHINE TOOL CO.
2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

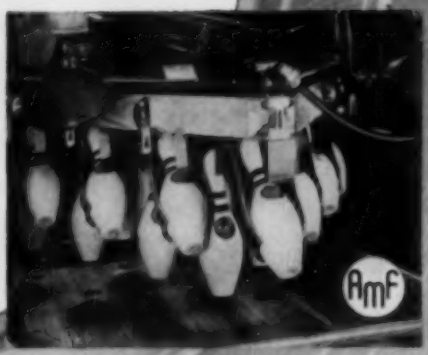
h
HYDRAULIC

up in the clouds...

When a Navy Training Plane points its nose skyward in defiance of gravity, everything from tip to tail must be a model of precision and endurance. Federal Ball Bearings are here, too, in the flexible drive assembly of this Lear actuating screwjack, which helps raise and lower the pilot's seat.

or down the lane!

Bowlers call it magic, the way the AMF Automatic Pinspotter sets 'em up—even replaces "off-spot" pins in their exact location after every roll. Federal Ball Bearings do their part in the gear boxes of these mechanical marvels.



so much of industry *turns* on FEDERAL ball bearings

Pilot's comfort or bowler's score. Production manager's quota or housewife's cake. All are important to those who design and build so many of the thousands of tools, machines and household appliances —with Federal Ball Bearings. 12,000 sizes. Hundreds of types. Produced by this 50-year-old manufacturer of ball bearings, *exclusively.*

When Federal Ball Bearings are part of so many things you *use*, shouldn't they be part of the things you *make?*

Federal

Ball Bearings

One of America's Largest Ball Bearing Manufacturers

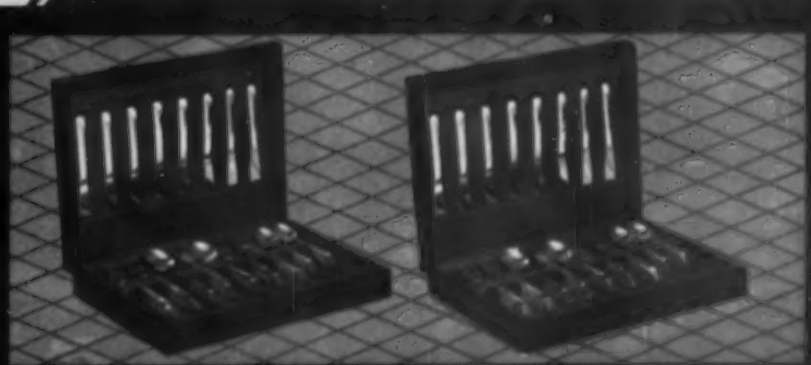
THE FEDERAL BEARINGS CO., INC. • POUGHKEEPSIE, N.Y.

New! Ball bearing and engineering data! 175 pages full in FEDERAL'S CATALOG! To get your copy, just drop us a line.

A NEW high finish and inherent beauty that comes through in the finished product makes certain grades of Sharon Stainless Steels practically indistinguishable from fine silver.

Think for a moment how this extra quality will enhance the appearance, utility and saleability of your product.

Which one is the *Stainless Steel?*



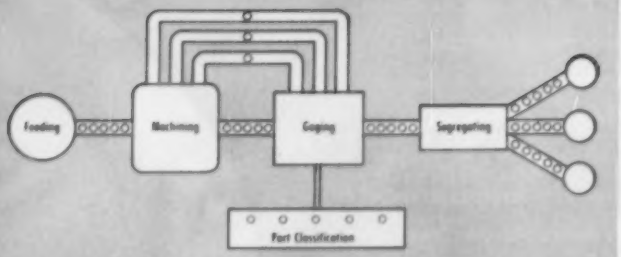
Stainless Steel Tableware never dulls, or tarnishes...self-polishes with use.

SHARON *Stainless Steel*

SHARON STEEL CORPORATION SHARON, PA.

DISTRICT SALES OFFICES: Chicago, Cincinnati, Cleveland, Dayton, Detroit, Grand Rapids, Indianapolis, Los Angeles, Milwaukee, New York, Philadelphia, Rochester, San Francisco, Sharon, Seattle, Montreal, Que., Toronto, Ont.

AUTOMATION DEMANDS *RELIABLE CONTROLS*



Dimensional control is the very heart of automation for the metalworking industry. Consequently, care in the selection of In-Process and Post-Process control devices is very important.

As a long recognized leader in air, electric and electronic gaging, Sheffield is prepared to furnish either:

- **Packaged controls and tooling ready to install**
- **Complete automation gaging and transfer systems ready to operate**

FUNCTIONS and ADVANTAGES

- Determine minute dimensional variations, rapidly and with repetitive precision
- Initiate warning signals
- Actuate control mechanisms
- Segregate acceptable, oversize and undersize parts
- Accurately classify parts by sizes
- Accommodate almost limitless range of tolerances
- Operate with interchangeable tooling
- Are small, compact and easily mounted
- Have unusually long, trouble-free service life
- Are easily interchanged

7125

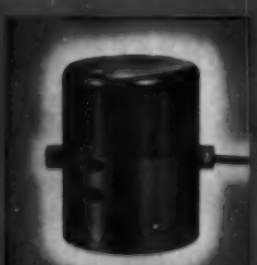
Shown here are a few of those Sheffield control units so widely used in automated systems.

AIRLECTRIC

A limit type pneumatic control to actuate signals and relays.

LECTROLAIR

A sealed-in control to actuate signals and relays and also to give visual size indication.



DIFFERENTIAL

A gage head for checking taper, hole parallelism or hole center distance and converting the result into an actuating electrical impulse.

VARIATION

A pneumatic gage head for external or internal dimensions and face to axis runout—converts the result into an actuating electrical impulse.

For more detailed information, write for Bulletin AU-1154

The Sheffield Corporation
Division 17
Dayton 1, Ohio, U.S.A.

MASTER CRAFTSMAN SHEFFIELD HEADQUARTERS

SHEFFIELD

MANUFACTURE AND MEASUREMENT FOR MANKIND

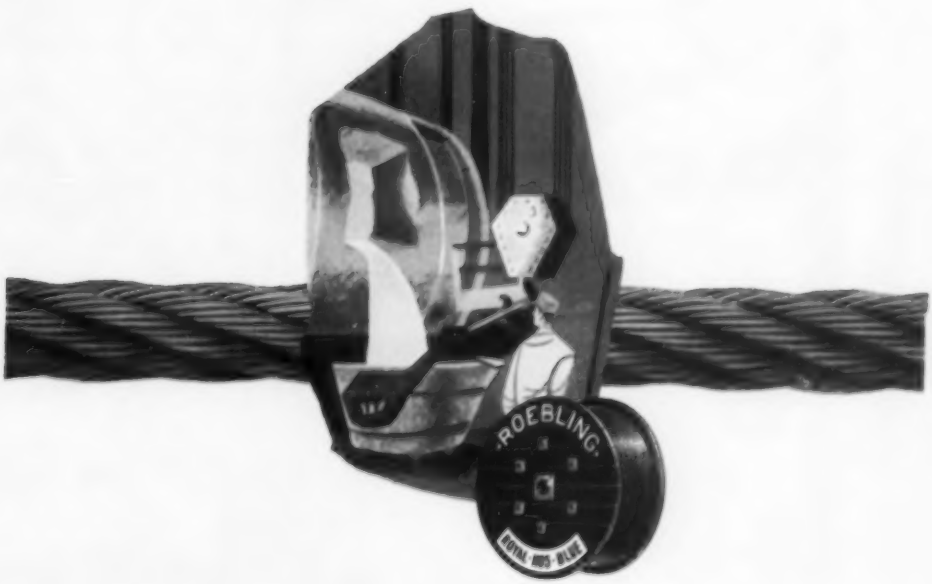
strong

Roebling's finest!

Royal Blue's extra strength

vastly increases...even doubles...

wire rope service life



John A. Roebling's Sons Corporation, Trenton 2, N. J., Subsidiary of The Colorado Fuel and Iron Corporation BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2340 GLENDALE-MILFORD RD., EVENDALE • CLEVELAND, 13625 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 5216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • PITTSBURGH, 1723 HENRY W. OLIVER BLDG. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6.

TISHOLT

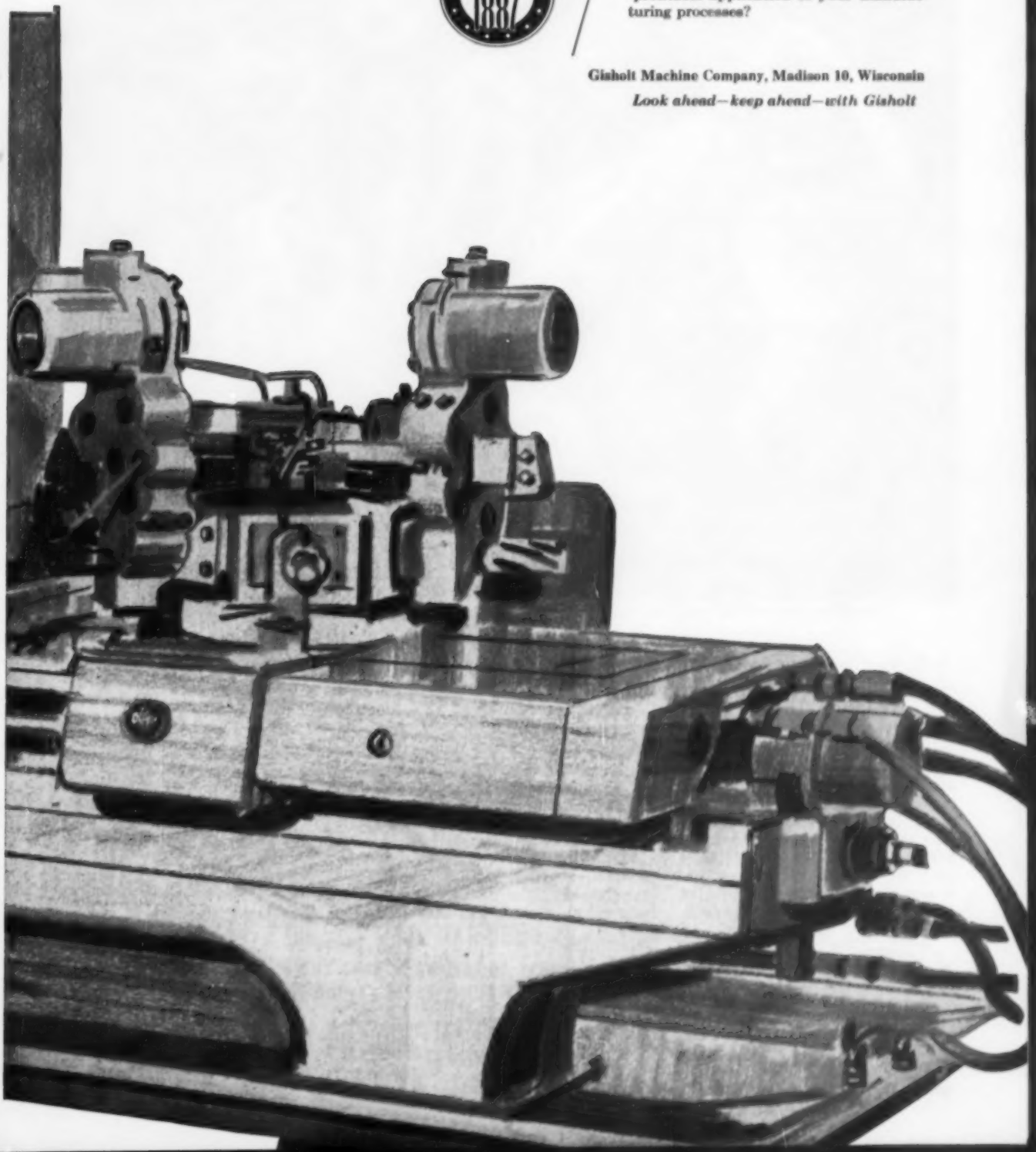
GISHOLT MASTERLINE FASTERMATIC AUTOMATIC TURRET LATHE

MASTERLINE
GISHOLT SINCE 1887

This latest design Gisholt MASTERLINE Fastermatic Automatic Turret Lathe offers many outstanding features which give you faster, easier operation, higher quality work, quicker setup and lower maintenance. In short, this machine will do your work faster and better at less cost —and with a new minimum requirement for operator skill, effort and attention. May we give you more facts about its profitable application to your manufacturing processes?

Gisholt Machine Company, Madison 10, Wisconsin

Look ahead—keep ahead—with Gisholt



See what adhesives are doing today!

The ribbon you see helps make this trailer home snug and weatherproof. It's an adhesive 3M Ribbon Sealer.

Fighting weather with a ribbon

Sealing weather out of trailer homes used to be a problem. Water sometimes leaked through seams, spoiling interiors, wetting insulation, corroding metal. But today this manufacturer seals all exterior lap seams with an adhesive 3M Ribbon Sealer. Since using EC 1202 he has had *no leaks* in exterior seams. This 3M product fights weather right to a standstill.

Workers easily roll this flexible, synthetic rubber ribbon along the edge of one aluminum sheet before screwing down the next. Fabric-reinforced EC-1202 is tough. It neither stretches, shrinks nor deteriorates, even during 140°F. paint drying. In fact, EC-1202 adheres so tightly it helps hold the metal together. The result—a uniform, economical, durable seal that shuts out water, dust and moisture for keeps.

Whether you face a specific problem or a general need, call upon 3M research and development. Consult your nearest 3M Field Engineer—or for literature and further information write to 3M, Dept. 309, 417 Piquette, Detroit 2, Michigan.

PRODUCT OF 3M RESEARCH

See what adhesives can do for you!

3M ADHESIVES

ADHESIVES AND COATINGS DIVISION, **MINNESOTA MINING AND MANUFACTURING COMPANY**

417 PIQUETTE AVE., DETROIT 2, MICH. • GENERAL SALES OFFICES: ST. PAUL 6, MINN. • EXPORT: 99 PARK AVE., N. Y. 16, N. Y. • CANADA: P. O. BOX 757, LONDON, ONT.

MAKERS OF "SCOTCH" BRAND PRESSURE-SENSITIVE TAPES • "SCOTCH" BRAND SOUND-RECORDING TAPE • "SCOTCHLITE" BRAND REFLECTIVE SHEETINGS • "3M" ABRASIVE PAPER AND CLOTH • "3M" ADHESIVES AND COATINGS • "3M" ROOFING GRANULES • "3M" CHEMICALS

want a nearby source?

If you do, you'll like the service you get at any of Crucible's nearby warehouses. Special steels of all types, sizes, and grades are in good supply. And service is speedy and dependable.

One good reason is that Crucible is *large enough to serve you—small enough to want to.*

Stocks maintained of:

Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting Die and Plastic Mold Steel, Drill Rod, Tool Bits, and Hollow Tool Steel Bars) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . Max-el, HY-Tuf, AISI Alloy . . . Onyx Spring, Hollow Drill Steel and other special purpose steels.

CRUCIBLE WAREHOUSE SERVICE

Crucible Steel Company of America

General Sales Offices, The Oliver Building, Mellon Square, Pittsburgh 22, Pa. Branch Offices and Warehouses: Atlanta • Baltimore • Boston • Buffalo • Charlotte Chicago • Cincinnati • Cleveland • Dallas • Dayton • Denver • Detroit • Harrison • Indianapolis • Los Angeles • Milwaukee • New Haven • New York Philadelphia • Pittsburgh • Portland, Ore. • Providence • Rockford • San Francisco • Seattle • Springfield, Mass. • St. Louis • St. Paul • Syracuse • Toronto, Ont.

Largest machine in United States for now producing

KOPPERS designed and constructed the machine shown here for the Weirton Steel Company, Weirton, West Virginia—a division of National Steel Corporation. The iron-ore sinter produced on this machine makes possible a substantial reduction in blast-furnace coke rate and also increases pig-iron production.

This 8-foot-wide machine is now producing 2,400 net tons of high-quality sinter per day. It is the largest used in the United States for iron-ore sintering.

But it won't be for long.

Right now, also for National Steel, Koppers is designing and constructing two 12-foot-wide sintering machines. One machine will have the capacity to produce more than 7,000 net tons per day, thus making it the largest in the world.

These two new contracts from National Steel illustrate how important the sintering process has become to production men who must meet the heavy demand for steel.

Designing and constructing sintering plants is just one way in which Koppers serves the steel industry. For any kind of metallurgical construction, you can count on Koppers. You are invited to consult with our Engineers and Management.

KOPPERS COMPANY, INC.

PITTSBURGH 19, PENNSYLVANIA

FREYN DEPARTMENT

American Ore Reclamation Section

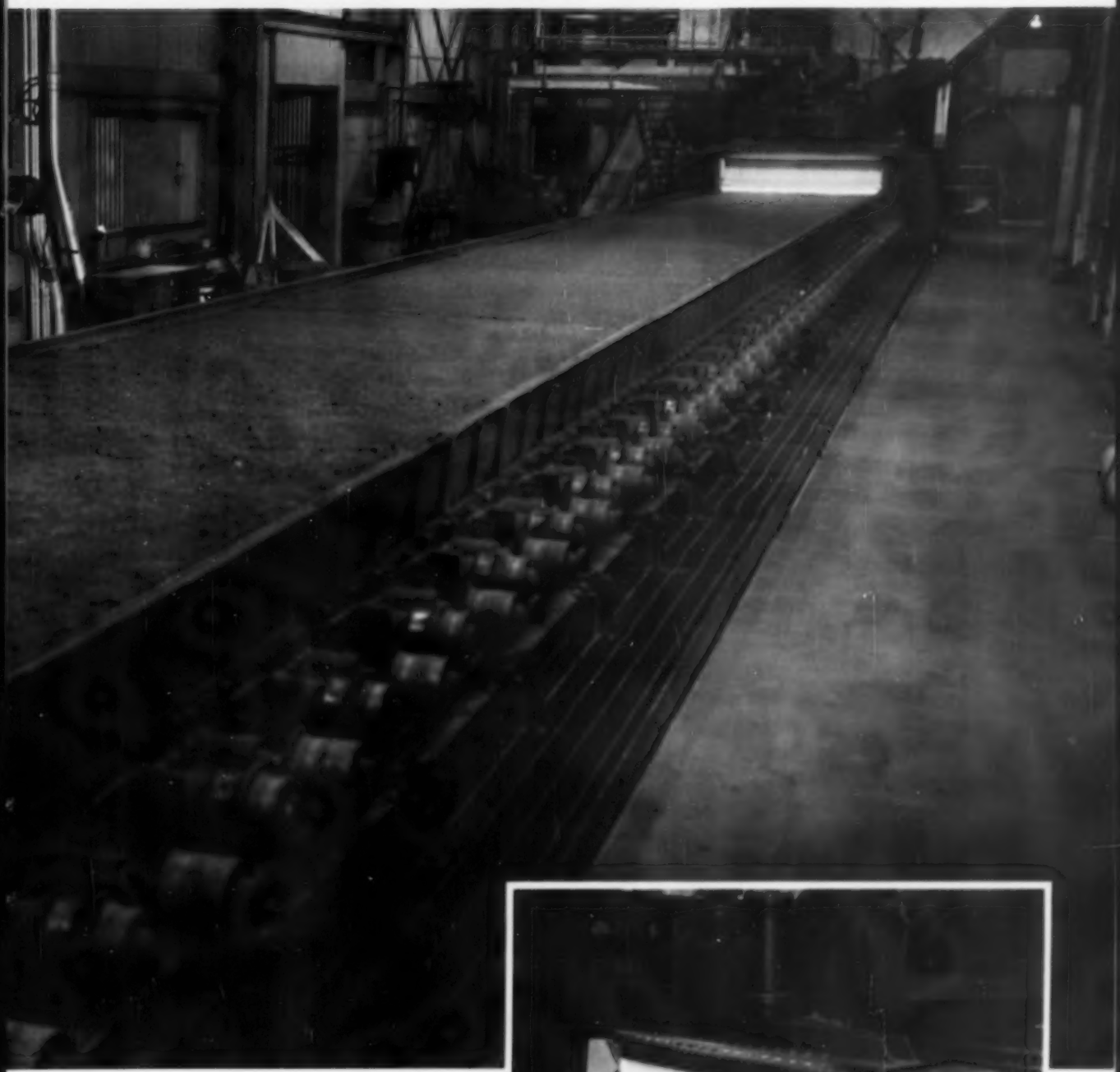
KOPPERS

KOPPERS

ENGINEERING AND CONSTRUCTION

iron-ore sintering

2,400 net tons of sinter per day



▲ *View of Weirton Steel's new 8-foot sintering machine, looking toward feed end. It is the widest iron-ore sintering machine in the United States.*

Inset shows ignition furnace and vibrating spreader feeder, which eliminates conventional swinging spout. ▶

IT'S EASY TO ORDER THE BEST DRILL FOR THE JOB

From this "Buffalo" Line

1 **CAPACITY RANGE** from the smallest commercial drill sizes to 1½" in mild steel.

2 **CHOICE OF FEEDS** — sensitive or power feed, hand or foot controls.

3 **CHOICE OF SPINDLE SPEEDS** — optional motor speeds and adjustable V-belt drive for the right drilling, tapping or reaming speed; or variable speed drive in the famous "RPMster".

4 **CHOICE OF ONE TO SIX SPINDLE MODELS** for single or multiple operations in all capacities.

5 **ACCESSORIES** — such as slow-speed, tapping and mortising attachments, work lights, vise tables and coolant systems.

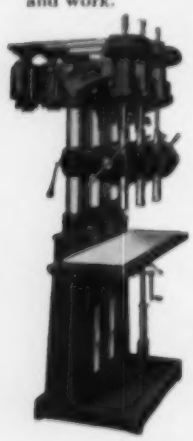
6 **ARRANGEMENTS** — horizontal duplex, radial, inverted head and many others to make more jobs easier.

BUILT-IN ACCURACY, CONVENIENCE, LONG LIFE

For 79 years, "Buffalo" has been building exclusively industrial drills with the best and most practical features, which we call the "Q" Factor*:

1 **PRECISION BALL BEARING SPINDLES** — high grade steel, ground, polished and dial gauge tested for trueness; take-up adjustment of ball bearings for wear.

2 **CONVENIENT CONTROLS**, table and head adjustment cranks for quickest and easiest handling — excellent visibility of all parts and work.



3 **STRONG, RIGID CONSTRUCTION**, including oversize columns, spindles, bases and true work tables. In pedestal models, ways are hand scraped.

Write us about your drilling problem — we'll mail you Bulletins and recommendations.

**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

"Buffalo" #16, 3-Spindle Pedestal Drill — Power Feed. ⅞" capacity in mild steel.

The "RPMster" — instant speed control from 100 to 3000 R. P. M.

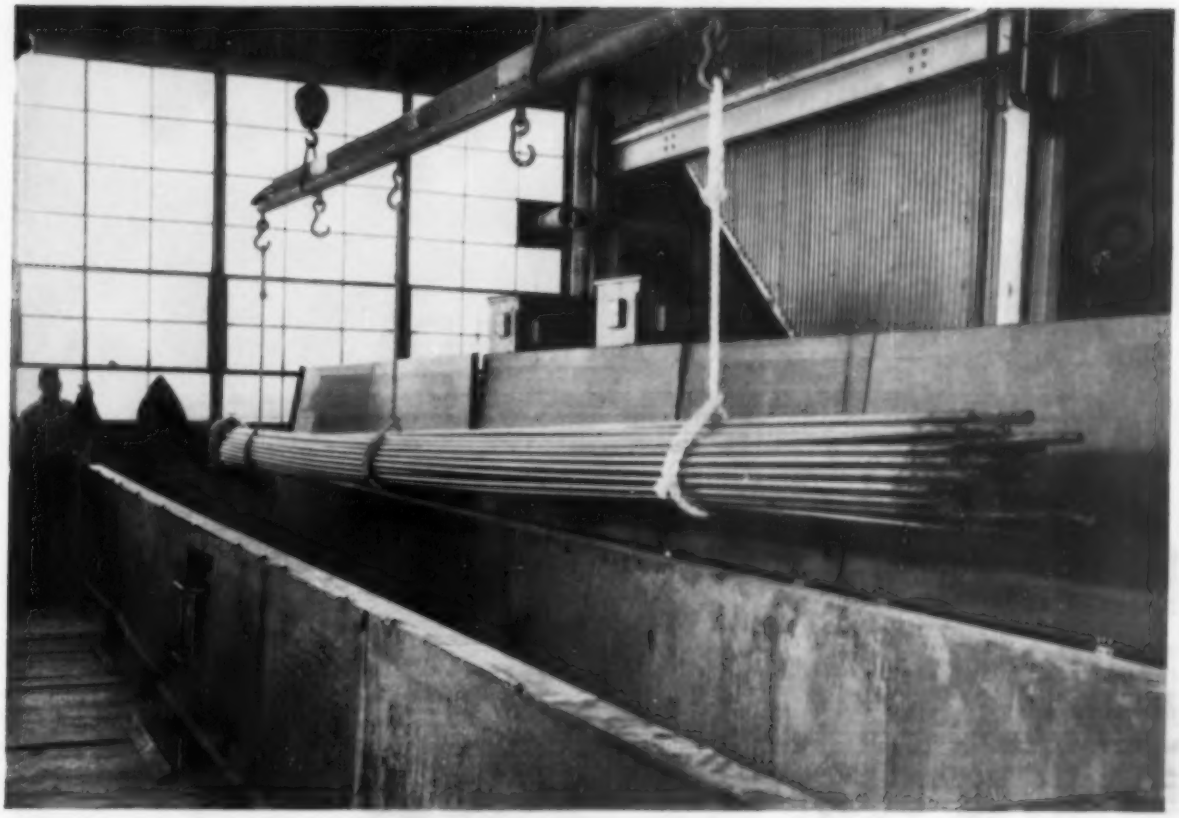
BUFFALO FORGE COMPANY

158 MORTIMER ST. BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

DRILLING PUNCHING SHEARING BENDING



Sawhill Tubular Products reports:

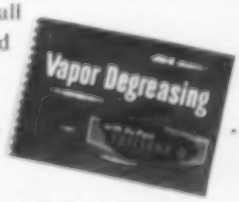
"Thorough cleaning, no etching when we degrease tubing with TRICLENE® D"

"We've bought 'Triclene' D by the tank-wagon load since it first came on the market," says Mr. C. H. Albright, General Purchasing Agent of Sawhill Tubular Products, Inc., Sharon, Pa. "And it's the most efficient solvent we've found for degreasing stainless- and carbon-steel capillary tubing—inside and out.

"In addition to thorough, trouble-free cleaning, 'Triclene' D also makes our next operation—annealing—much easier. Here, any residue on metal surfaces affects the quality of the anneal. After switching to 'Triclene' D, we noticed a healthy reduction in the number of rejects."

Other advantages noted by Sawhill were easier solvent control, steadier pH and no etching on highly polished surfaces. In short, Sawhill had fewer solvent worries.

GET ALL THE FACTS about "Triclene" D and vapor degreasing in this new 42-page booklet. Here you'll see how this rugged solvent is used for all metals and in all industries. Send for your free copy today.



TRICLENE® D
TRICHLORETHYLENE

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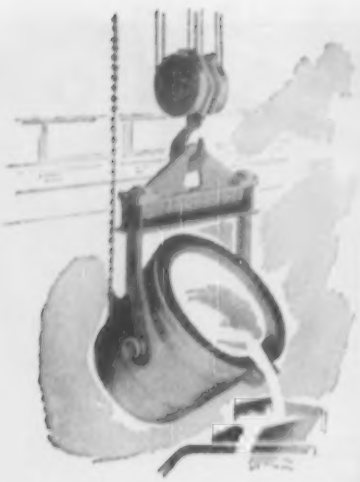
BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department S-9
Wilmington 98, Delaware

☐ Please send me a copy of your new vapor-degreasing booklet.
☐ Please have your Representative phone for an appointment.

Name_____ Title_____
Company_____
Address_____
City_____ Zone_____ State_____



Erosion From Molten Copper Reduced 300%

23-Ton Ladle Protected With HASCROME rod by Submerged-Arc Method

The hard-facing operation shown above will increase the service life of this cast steel ladle by as much as 300 per cent. The material being applied is HASCROME rod . . . a high chromium alloy that effectively resists the destructive chemical action of molten copper. The alloy is deposited on the bottom and spouts of the ladle . . . the areas most vulnerable to erosion during pouring operations.

Despite the size of the ladle . . . 6 ft. high and about 8 ft. in diameter . . . the facing operation was accomplished rapidly. Coiled rod, applied by mechanized submerged-arc equipment, was used to cover the bottom and the spouts of the ladle. Facing speed averaged 7 inches per minute. Manual metallic-arc equipment and 14-in. long coated rods were used to face the contours around the spouts.

HASCROME rod, used so successfully here, is an iron-base material that also excels in applications requiring a tough, abrasion-resistant alloy. It has outstanding resistance to impact and sudden shocks.

There are 19 HAYNES hard-facing alloys . . . a wide selection that guarantees you the right rod at the right price for your wear problem. They all can be deposited with standard welding equipment. For descriptive literature on the complete line of HAYNES rods, contact your nearest Haynes Stellite Company office.

HAYNES TRADE-MARK ALLOYS

HAYNES STELLITE COMPANY

A Division of Union Carbide and Carbon Corporation

UCC

General Offices and Works: Kokomo, Indiana

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Chicago · Cleveland · Detroit · Houston · Los Angeles · New York · San Francisco · Tulsa

"Haynes" and "Hascrome" are registered trade-marks of Union Carbide and Carbon Corporation.

HE KEEPS THEM ROLLING—
THE MAN FROM ATLANTIC

The Atlantic specialist in industrial lubrication is a highly skilled expert. He's spent years in the study of every heavy lubricating and cutting-oil problem . . . and he's backed by other Atlantic specialists in lubrication research, production, quality control and marketing.

Atlantic's experience since 1870 has made us familiar with *your* lubricating needs. We've developed the products necessary to do any lubrication job perfectly . . . at the lowest cost . . . for every wheel that turns in industry.

Your company can benefit from our extensive experience and services. For further information on Atlantic's family of products for industrial lubrication and metal processing, write or wire Dept. S9, The Atlantic Refining Company, at the nearest office listed below.

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LUBRICANTS · WAXES
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New

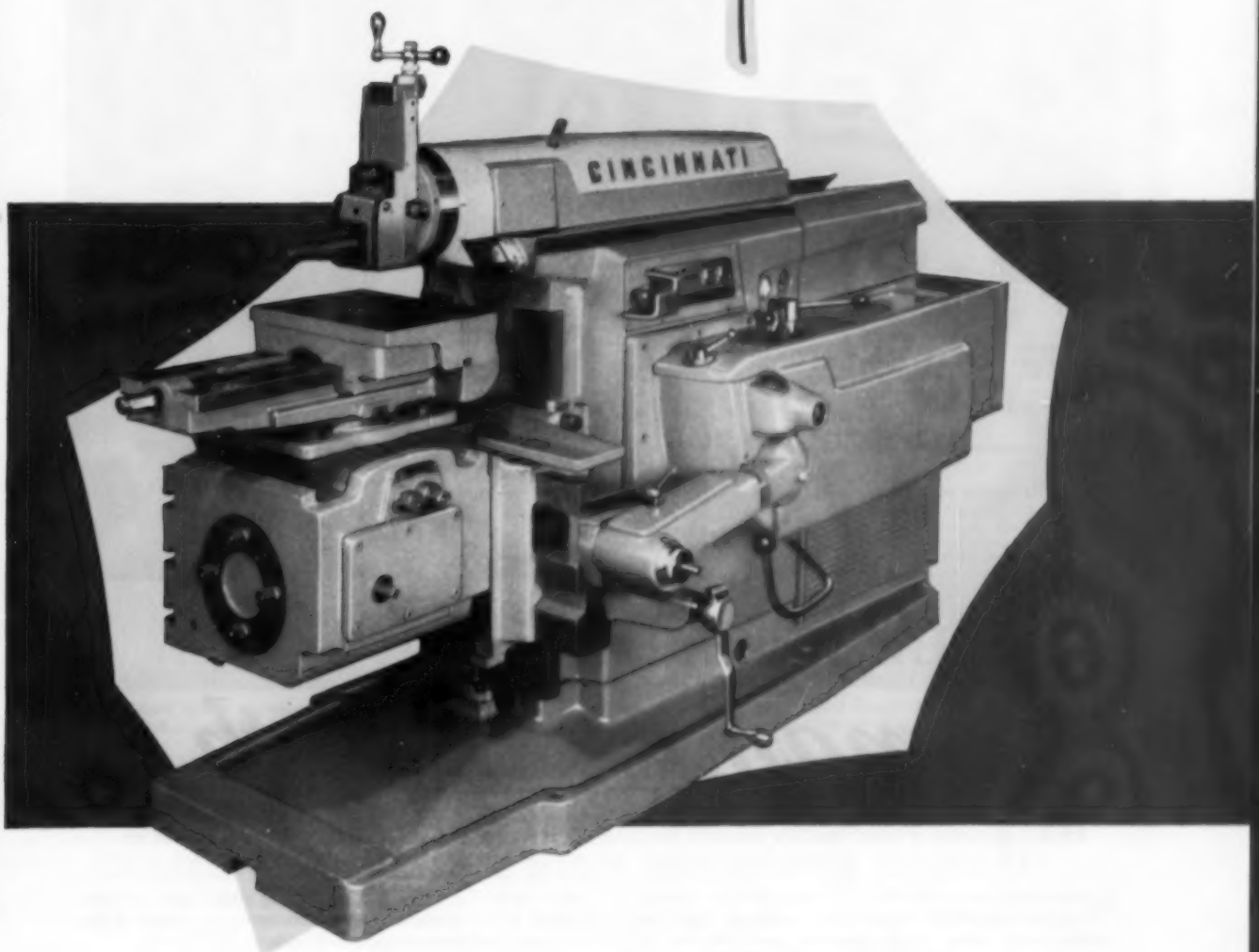
New Cincinnati Rigid Shapers

New Look

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

Accuracy...

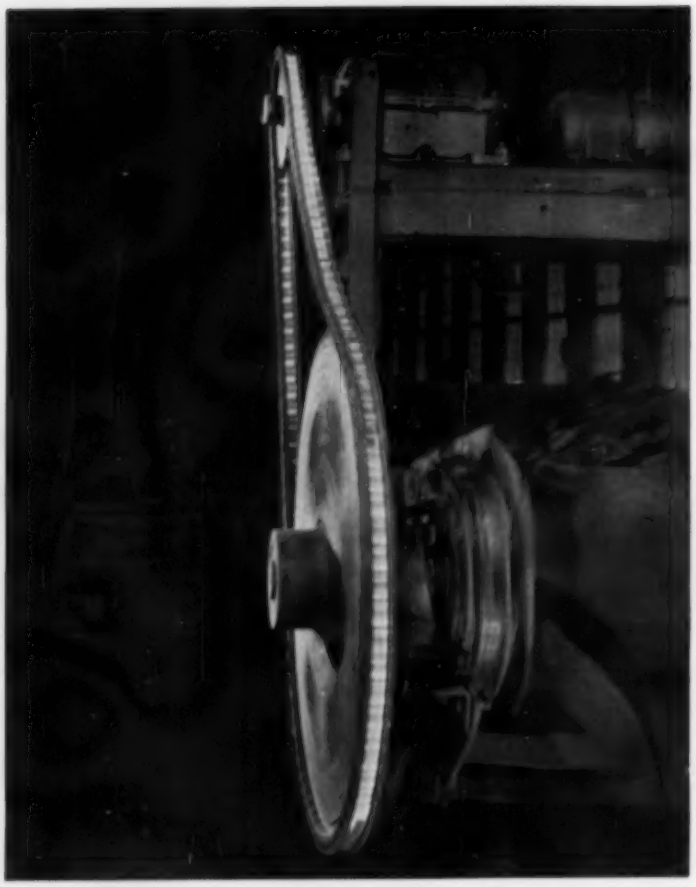


Very rigid and powerful—the New Cincinnati Rigid Shapers give a new accuracy—on heavy cuts and light cuts. They have the most rigid column and ram in shaper history. The Electro-magnetic clutch and brake and 50 PSI positive lubrication are exclusive features that give continued, efficient and accurate performance.

Write for bulletin on these new Cincinnati Rigid Shapers.

To static strength . . .

RESISTANCE TO TENSILE STRESS is achieved by use of properly heat-treated, accurately-machined sidebars made of premium steel and fitted with properly-hardened pins, bushings and rollers. But to resist *operational* stresses, additional controls over accuracy, uniformity and roller resiliency are essential.



STRENGTH OF CHAIN IN MOTION is accomplished through tensile strength *plus* special Link-Belt refinements. These include pitch-hole preparation, micro-finish of parts, special processing of sidebars, pre-lubrication and rigid quality control from initial selection of materials to final protective boxing.

LINK-BELT adds great

dynamic strength

that gives Precision Steel Roller Chain on-the-job endurance

WHEN selecting roller chain for your drive or conveying job, durability under actual working conditions is what you're after. That's *dynamic strength*—and it's built into *every length* of Link-Belt Precision Steel Roller Chain. From it comes resistance to such operating stresses as engagement with sprockets, shock of starting loads, centrifugal loads and others.

No one feature can establish high dynamic strength. It results from a combination of Link-Belt "extras" . . . plus other special methods of design, manufacturing and processing. On the job, it means extended life, positive action, less maintenance.

Ask your Link-Belt office or authorized stock-carrying distributor for Book 2457, covering single and multiple width roller chain and sprockets in ¼ to 3-inch pitch . . . and in double pitch, 1 to 3-inch.

LINK-BELT

ROLLER CHAIN & SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.125

LINK-BELT gives you dynamic strength that comes from these important EXTRAS

PRE-STRESSING of multiple width chain provides uniform load distribution.

SHOT-PEENED rollers have greater fatigue life, added ability to withstand impact.

CLOSE HEAT-TREAT CONTROL — coupled with rigid testing insures uniformity.

LOCK-TYPE BUSHINGS (applied on a range of sizes) end a cause of stiff chain.

This 50,000 gallon capacity air accumulator vessel is one of many under construction by Allied Steel Products Corporation, Newport, Delaware, for a government aircraft development project. Each of the vessels is fabricated entirely of Lukens "T-1" steel.

Fabricator of giant air accumulator says:

"LUKENS HIGH YIELD STRENGTH 'T-1' WELDS EASIER THAN OTHER HIGH-STRENGTH STEELS!"

■ A strong statement—but Lukens "T-1" steel is a remarkable new material. Reports from Allied Steel Products say it combines strength and toughness with excellent weldability—as found in no other alloy steel. On this project, every inch of weld was subjected to X-ray inspection.

The greater strength of Lukens "T-1" steel permits reduced plate thickness for a given pressure and vessel diameter. For example, this 11-foot inside diameter air accumulator's shell is only 1¼" thick, and the unit will be hydrostatically tested for a minimum working pressure of 585 psi. Operating temperatures will range from −20° to +125°.

Needless to say, Allied Steel Products looks forward to using Lukens "T-1" steel on other assignments in the very near future.

If your problem is equipment weight . . . abrasion, impact or atmospheric corrosion . . . the need for toughness at temperature extremes—it will pay you to investigate this amazing new alloy steel now.

For the latest in fabrication techniques and specifications, write to Manager, Marketing Service, 846 Lukens Building, Lukens Steel Company, Coatesville, Pennsylvania.

LUKENS "T-1" STEEL

LUKENS

THE NEWEST IN A COMPLETE LINE OF ALLOY STEELS
LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

60 second tour

shows it in a nutshell . . .

All-Inclusive Spring Service

COMPRESSION SPRINGS Regular, Double
COMPRESSION SPRINGS Special Shapes Variable pitch
VOLUTE SPRINGS Coned end
EXTENSION SPRINGS Special Hooks and Loops
EXTENSION SPRINGS Swivel End Drawbar

TORSION SPRINGS Single, double Edge wound
POWER SPRINGS Clock or Motor
FLAT SPRINGS Arched, Curved-beam Elliptical
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DIAPHRAGMS Discs, Plates
PLUS COLD-ROLLED SPRING STEEL

Divisions of

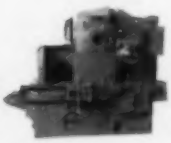
ASSOCIATED SPRING CORPORATION

W-1143

——tiny or **tremendous...**

W-1145

For best results...***PUT IT ON A BLANCHARD!***



Blanchard No. 18

Blanchard No. 42-84

There's a Blanchard for every surface grinding job, in a broad range of sizes. For example, the Blanchard No. 18 grinds non-magnetic transistor elements (upper left) .006" thick, to a tolerance of .0005" with good finish. This job, which involved .006" to .008" stock removal per side, was held on special fixture plates.

At the other end of the scale, a huge Blanchard No. 42-84 Grinder grinds a turbine housing (upper right) which measures 83" across the corners, and is 28" high. This housing, ground after rough machining, required .020" stock removal. Both this piece and its mating part were ground to a steam-tight joint.

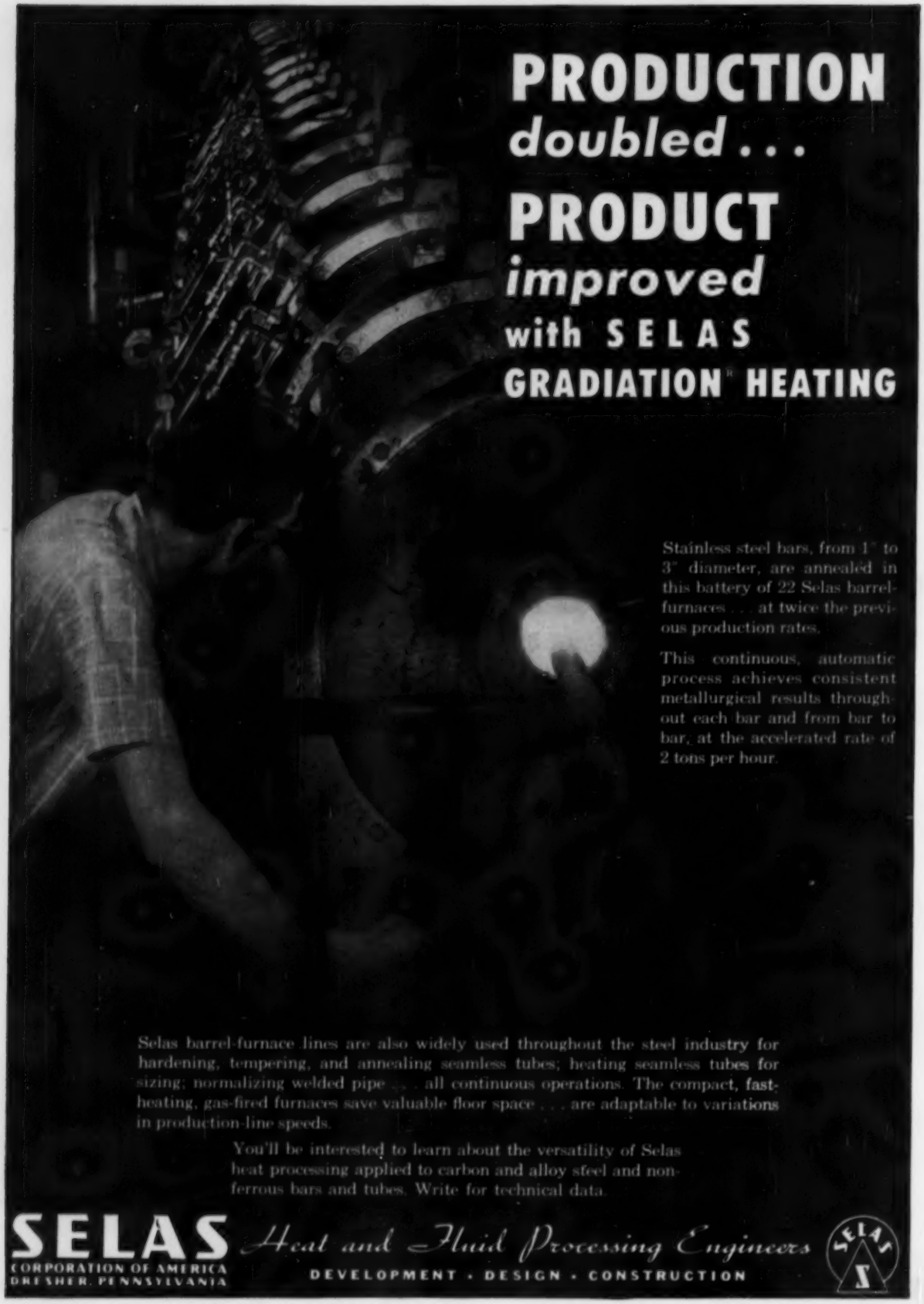
Whatever *you're* grinding—be it tiny watch parts, giant steel plates, or anything in between—there's a Blanchard designed to do the job speedily and accurately.

Ask for details on the 15 standard Blanchard models.

PUT IT ON THE BLANCHARD

Send for free copies of "Work done on the Blanchard", fourth edition, and "The Art of Blanchard Surface Grinding".

THE BLANCHARD MACHINE COMPANY 64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.



PRODUCTION *doubled . . .*

PRODUCT *improved*

with SELAS GRADIATION® HEATING

Stainless steel bars, from 1" to 3" diameter, are annealed in this battery of 22 Selas barrel-furnaces . . . at twice the previous production rates.

This continuous, automatic process achieves consistent metallurgical results throughout each bar and from bar to bar, at the accelerated rate of 2 tons per hour.

Selas barrel-furnace lines are also widely used throughout the steel industry for hardening, tempering, and annealing seamless tubes; heating seamless tubes for sizing; normalizing welded pipe . . . all continuous operations. The compact, fast-heating, gas-fired furnaces save valuable floor space . . . are adaptable to variations in production-line speeds.

You'll be interested to learn about the versatility of Selas heat processing applied to carbon and alloy steel and non-ferrous bars and tubes. Write for technical data.

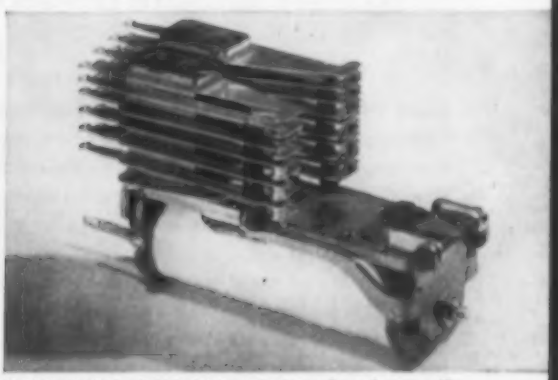
SELAS CORPORATION OF AMERICA
DRESHER, PENNSYLVANIA

Heat and Fluid Processing Engineers

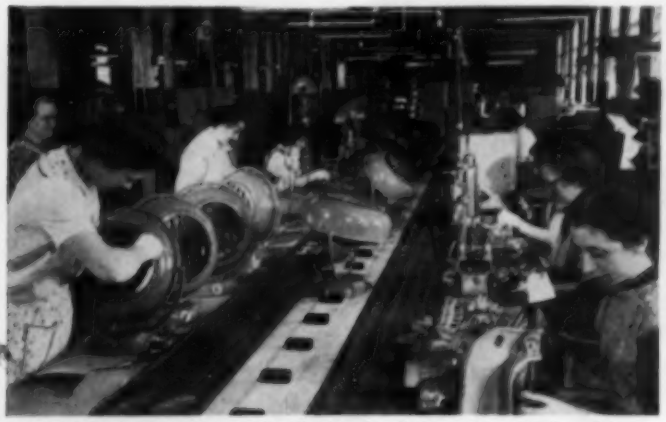
DEVELOPMENT • DESIGN • CONSTRUCTION

Why Design Engineers Prefer PHILLIPS CROSS RECESSED HEAD SCREWS

INCREASED SALES APPEAL is just one benefit credited to Phillips screws by Portable Electric Tools, Inc., prominent Chicago manufacturers. Engineer Shoemaker of this firm says, "Phillips screws reduce rejects, upgrade production, give a tighter bond and add a definite sales advantage to our finished products."



IN A MILLION ELECTRICAL RELAYS produced annually by the C. P. Clare Co. of Chicago, Phillips head screws aid product performance as well as production. Clare officials state that Phillips screws, besides speeding assemblies and improving product appearance, have the prolonged holding power vital to efficient relay operation.



"WINDSTREAMER" FANS, made by A. C. Gilbert Co. of New Haven, Conn., are protected against damage in assembly by the use of Phillips head screws. "For tight fit, neat appearance and production efficiency, Phillips screws are unequalled," is the report from this leading manufacturer of toys and electrical appliances.

MANUFACTURERS OF PHILLIPS CROSS RECESSED HEAD SCREWS

THE FASTENERS OF TODAY...
AND OF THE FUTURE
X marks the spot
the mark of extra quality

Pledged to highest standards...

The Phillips Screw manufacturers listed here cooperate to turn out a uniformly high standard of quality. As sponsors of the Phillips Cross-Recessed-Head Standards Committee they adhere to the established dimensional standards, gauges, and gauging methods which will best serve industry.

Members of Screw Research Association

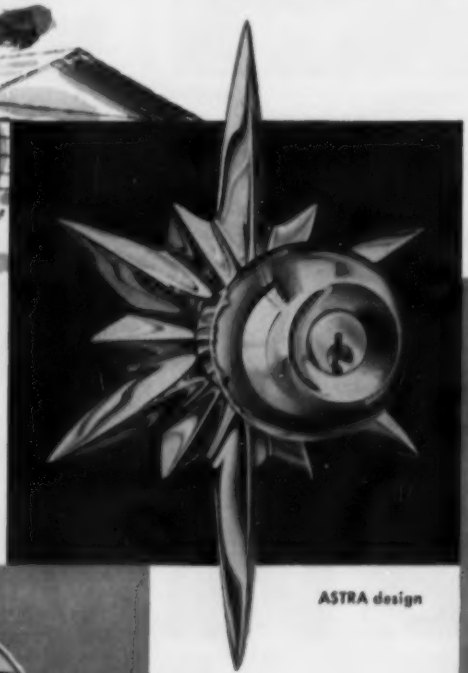
American Screw Company • Atlantic Screw Works, Inc. • The Blake & Johnson Co. • Central Screw Company • Continental Screw Co. Elco Tool and Screw Corporation • Great Lakes Screw Corp. • The H. M. Harper Company • The Lamson & Sessions Company • National Lock Company • The National Screw & Manufacturing Company • Parker-Kalon Division, General American Transportation Corporation Pheoll Manufacturing Co. • Scovill Manufacturing Company • Shakeproof Division Illinois Tool Works • The Southington Hdwe. Mfg. Company • Sterling Bolt Company • Universal Screw Company • Wales-Beech Corporation

MUELLER BRASS CO.

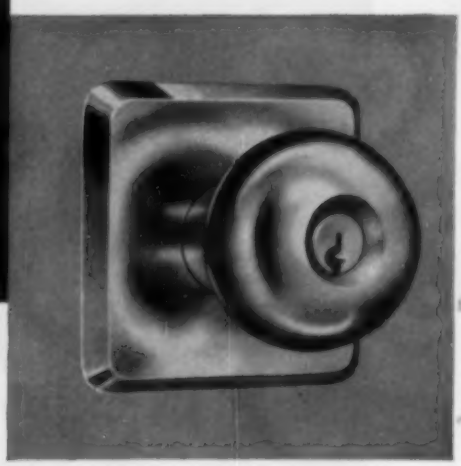
brass and bronze forgings help insure dependability and lasting jewel-like finish of distinctive SCHLAGE locks

Smart styling, handsome appearance and durability have been neatly combined by the Schlage Lock Company of San Francisco in their line of lock designs for residential and commercial use. Many important parts of these lock sets are brass and bronze forgings made by the Mueller Brass Co. The beautiful natural color, corrosion resistance, and inherent dependability of these forgings make them ideal for this purpose. In addition, the high degree of surface smoothness makes possible an exceptionally lustrous finish as well as a perfect plating surface when required. Then, too, the use of forgings has reduced costs, cut finishing time and greatly reduced the number of rejects when compared to the sand castings that were formerly used.

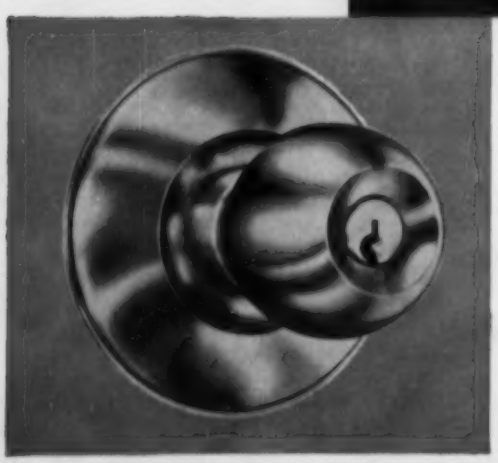
Whether you manufacture decorative hardware where finish is of prime importance or rugged assemblies that must stand up to bruising everyday punishment, it will pay you to investigate Mueller Brass Co. forgings. Strong, long wearing brass, bronze or aluminum parts, forged to your exact specifications under exacting statistical quality control standards can help you reduce costs, improve performance, and give you a better looking product. Write for our engineering manual (No. H-58565) . . . or call in one of our engineers to investigate possible forging applications in your products.



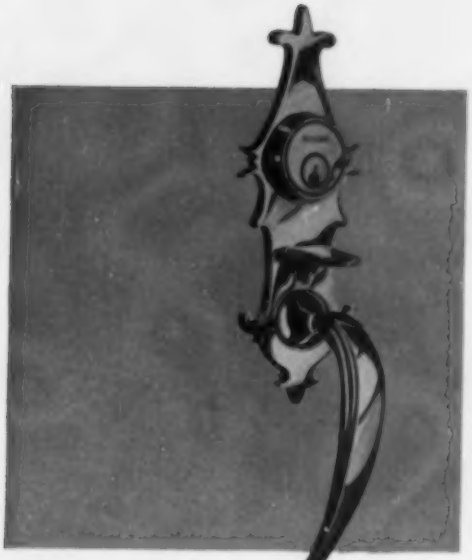
ASTRA design



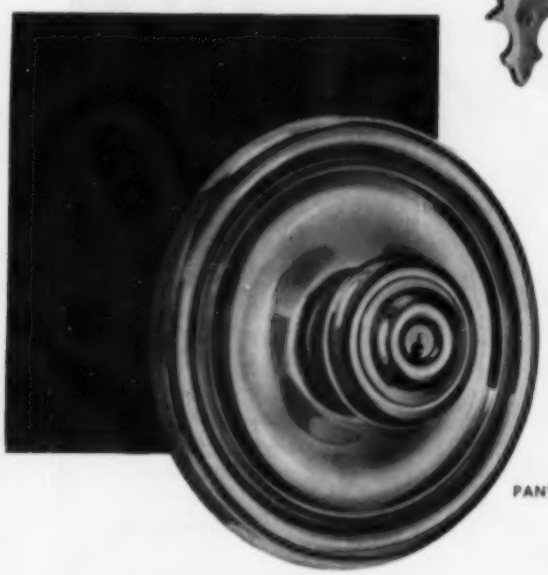
MONARCH design



MERCURY design



WAVERLY design



PANTHEON design

• WRITE TODAY FOR THE ENGINEERING MANUAL YOU NEED

Mueller Brass Co. Forgings
Engineering Manual H-58565 ☐

Tuf Stuf Aluminum Bronze Alloys
Engineering Manual H-58563 ☐

600 Series Bearing Alloys
Engineering Manual FM-3000 ☐

Copper Base Alloys in Rod Form
Engineering Manual FM-3010 ☐

METALS AND ALLOYS REVIEW

by FRANK M. LEVY
Vice-President and Director of Research

Last week one of our sales engineers was at the home office and we were talking about one of his customers in the East who manufactures milling machines which are being used for milling aircraft spars. We are supplying gibs, slide bars and wear strips to this company made of our "600" series bearing metal in rectangular rod form. The material formerly used was aluminum bronze* cast bars which they could only obtain in 36" lengths. Their engineering department estimates that costs have been reduced 50% on this component. Machining time has been reduced and impregnation of porous castings has been eliminated.

Our sales representative was curious about my experience with "600" in other applications such as this. Oddly enough, our own plant has been a pretty good proving ground. In our extrusion department, for example, we have gotten exceptionally good service from slides made of "600" and used on the die heads which are subject to pressure and extremely rough usage.

Bob Irwin of our forging department reports that the "600" strips he has used for lining the ways of our big forging presses have proved far superior to the bronzes which were original equipment. The bronze strips squashed out after protracted running. More important, the "600" strips last 10 times longer before replacement is necessary.

In our copper tube fabricating department we have a lot of automatic equipment for the production of formed tube shapes like tees and ells used in the plumbing industry. On one of the tube benders, there was no provision made for replacing worn forming slides. Our Maintenance Department reworked the machine using "600" strips as replaceable forming slide inserts. The bender is now a far more efficient machine. Because of the long life of "600", downtime on this machine has been practically eliminated.

While we were talking about these uses in our own plant, it brought to mind some other instances where the exceptionally good wearing properties of "600" have been established. A Cincinnati lathe manufacturer uses "600" in the form of counter sunk hex-headed screws on wearing strips used on lathe carriages. When the strip wears to the retaining screw the ways will not be scratched.

According to their own records, all other materials which they had tested proved unsatisfactory for the job. Another maker of precision lathes and milling machines found that after a year of exhaustive tests, the "600" metal that was used as nuts on compound slide screws outlasted competitive metals at an approximate ratio of 3 to 1 at an estimated saving of 30%.

Sliding surfaces on all kinds of machinery have different wear characteristics, as you have undoubtedly found. If you have any problems involving gibs, slide bars or wear strips that are proving troublesome, why not drop me a line or send a part print and we'll be glad to study it and make the proper recommendations.

*We manufacture 4 grades of wrought aluminum bronze.

MUELLER BRASS CO.

PORT HURON 19, MICHIGAN

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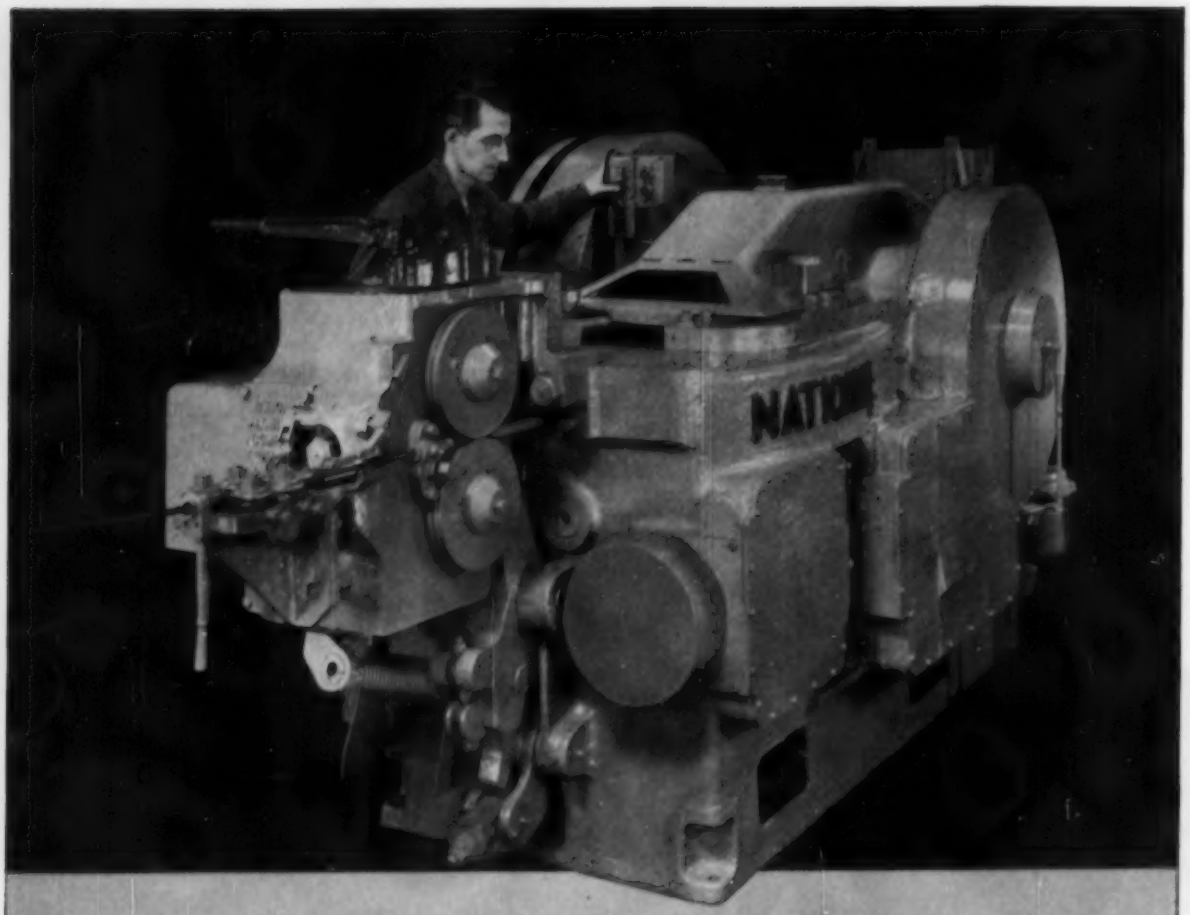

NATIONAL COLD HEADERS NOW AVAILABLE AT NEW HIGHER SPEEDS!

Standard-stroke National Cold Headers now operate at new higher speeds, as a result of dynamic counterbalancing and improved design of critical moving parts.

For example, the new ⅜" D8SD headers, like the one shown above, are producing 135 pieces per minute! Tool life is better and maintenance is still lower than on the earlier ⅜" models which operated at 100 pieces per minute.

Of course, all the time-proved advantages of National Headers still apply:

1. Easier, quicker to set up and adjust.
2. Compact construction; minimum floor space.
3. Simplicity – minimum of parts and movements.
4. Rigidity – for accuracy and maintenance of adjustment.
5. Die-engineering and development assistance.

We invite you to our plant to investigate how latest-design National Headers – and other National hot- and cold-process Machinery – can bring you new advantages through the fast, automatic production of your forged metal fasteners and components.

NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO — SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS

Hartford Detroit Chicago

➔ Take a long look into the future. You'll see constantly growing industrial activity and millions of tons of *power-packed* Bituminous produced to sustain it, with *billions* still in reserve! B&O is a keystone to this vital supply and demand. The coal fields it serves hold proved, usable reserves of billions of tons of Bituminous for every purpose.

Today, tomorrow or decades ahead you may be sure that B&O Bituminous can be *your* best source of stable-low-cost power. It will pay you to use this *fuel with a future* NOW! *Ask our man!*

CONTACT OUR COAL TRAFFIC REPRESENTATIVE!

You'll receive details in the most efficient, low-cost Bituminous coal for your particular requirements.
COAL TRAFFIC DEPARTMENT B&O RAILROAD
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BALTIMORE & OHIO RAILROAD

Your unusual, non-standard parts

are "naturals" for Cleveland's Custom Production... Applying 40 years experience making *Top Quality* Cap Screws...

Simplify your special parts production problem. Your quantity-run designs are handled by Cleveland to your complete satisfaction, with savings in time, cost and machining. And they're stronger, more dependable as made by our Kaufman Process with our long specialized experience in cold extrusion and hot heading.

We work to your exact design and materials specifications—or stand ready to offer our suggestions for improvement in either, if you want them. Watchful control follows your job; preparation and testing of material, checking in process, and final inspection, to assure you parts as you want them—physical properties as desired, uniform, accurate to close tolerances, concentric, correct pitch diameter, proper heat treating, and other limits that may apply.

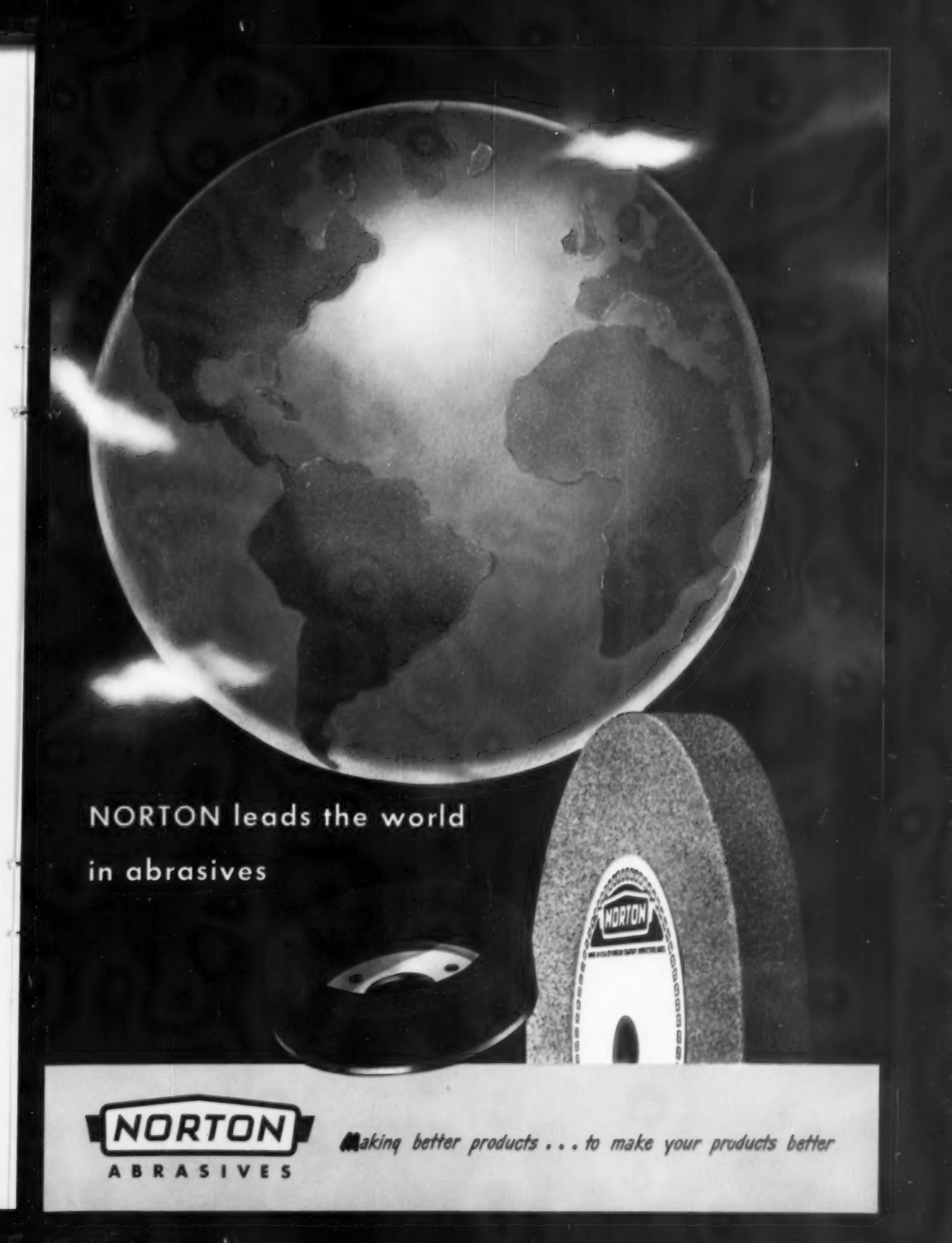
Find out how Cleveland Custom Service can help you in your special parts production. Write for folder on special headed and threaded products.

All of the special parts illustrated were cold-forged by the Kaufman Double Extrusion Process.

The Cleveland Cap Screw Company

2935 East 79th Street • Cleveland 4, Ohio • VUlcan 3-3700 TWX CV-42

Warehouses: Chicago • Philadelphia • New York • Providence • Los Angeles


NORTON leads the world
in abrasives
NORTON
NORTON
ABRASIVES
Making better products . . . to make your products better

NORTON BRINGS THE "TOUCH of GOLD" TO GRINDING JOBS THE WORLD OVER

THE TRUE "TOUCH OF GOLD" in grinding can happen only when the grinding wheel — or other abrasive product — is doing the best possible job. That is, when it is saving the most time and money — adding the greatest value to the product being ground — and boosting grinding profits to the maximum. These are the benefits built into all Norton abrasives.

And here are some of the ways in which Norton makes sure *you* can add the "Touch of Gold" to every grinding job you do . . .

THE BROADEST LINE. Norton offers you the widest choice of abrasive products — available in hundreds of thousands of different grinding combinations, so you will get exactly what you need for best production at lowest cost.

EACH NORTON PRODUCT is manufactured to strictest quality control standards. And each is backed by research and development that have produced the greatest number of abrasive advancements in the field. For example: 32 ALUNDUM® abrasive, unequalled for fast, cool cutting action on today's steels . . . G Bond, most efficient vitrified bond ever developed . . . and STARBORN boron carbide, hardest material made by man on a commercial production basis.

YOUR NORTON DISTRIBUTOR is ready to help you on any grinding problem. His factory-trained specialist will see that you get exactly the right wheel for each job. And your Norton Abrasive Engineer is always available for expert technical consultation. Take advantage of these application aids to better, more profitable grinding.

FAST SERVICE FROM FULL STOCKS. Norton Distributors, in 300 cities in the U. S. A., maintain stocks fully adequate to the needs of each area. They, in turn are backed up by warehouse stocks in five major industrial areas, and by the vast stocks in the mile-long Worcester plant. Serving customers abroad are 12 Norton plants and scores of Distributors.

*Trade Mark Reg. U. S. Pat. Off. and Foreign Countries

NORTON
ABRASIVES

Making better products...
to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels
Grinding Machines • Refractories
BEHR-MANNING PRODUCTS: Coated Abrasives
Sharpening Stones • Pressure-Sensitive Tapes

NORTON COMPANY, Worcester 6, Mass.

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Distributors in all industrial areas — see your classified telephone directory

BEHR-MANNING, Troy, N. Y. is a division of Norton Company

Export: NORTON BEHR-MANNING OVERSEAS INC., Worcester, Massachusetts

"Automated" chromium bath helps cut plating costs

♦ **Chemical control greatly simplified with Unichrome SRHS® Chromium Plating Process**

♦ **Manhours saved . . . bath automatically kept in optimum balance . . . consistently good results assured.**

Remarkable feature of SRHS Solution is the *self regulation* of important chemical constituents. In effect, this means that control has been automated.

OPERATION IS EASIER

Unlike ordinary chromium, there's no need to make lengthy analyses of samples of the SRHS solution . . . no need to lose time determining additions to the bath to bring it up to proper balance for good plating. Instead, the unique formula of the SRHS compound permits a reserve of undissolved chemical to be available in the tank and ready to dissolve automatically in just the right amount needed to replace losses. Just a simple hydrometer reading tells when to add more SRHS compound.

By maintaining themselves continuously in peak plating balance, the SRHS baths provide not only a more foolproof operation, but also better results.

RESULTS ARE IMPROVED

Through this *automated* control of plating balance, the unusual benefits of SRHS are achieved to the fullest. Plants plate up to twice as fast as with ordinary chromium . . . save on power consumption . . . gain more production capacity without extra equipment . . . and reduce "burning" and "missing" (major causes of rejects).

This process is just one of Metal & Thermit's many Unichrome processes and materials which provide opportunities to cut your finishing costs . . . opportunities to turn out a better product through a better finish. We'd welcome the chance to work with you.

Unichrome is a trade mark of Metal & Thermit.

PLATING MATERIALS
ORGANIC COATINGS
TIN & TIN CHEMICALS
CERAMIC MATERIALS
RADIOGRAPHIC EQUIPMENT
WELDING SUPPLIES
METALS & ALLOYS
HEAVY MELTING SCRAP

UNICHROME

METAL & THERMIT
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GENERAL OFFICES: RAHWAY, NEW JERSEY

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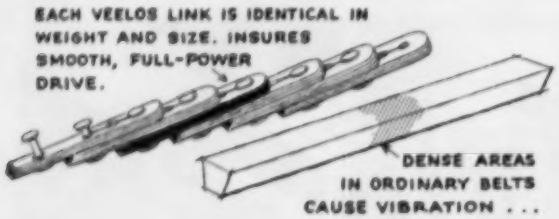
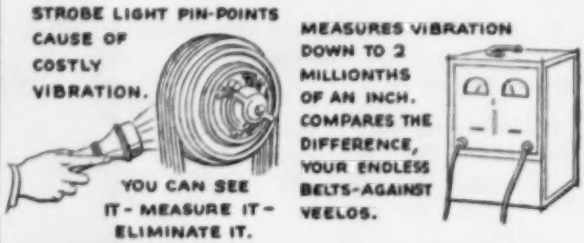
In Canada: Metal & Thermit-United Chromium of Canada, Limited, Toronto

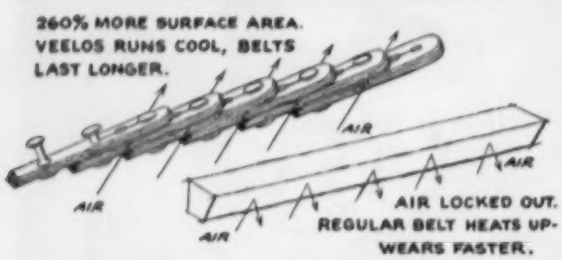
Six Reasons Why Veelos Adjustable V-Belts Are Better For Your Drives!


EACH VEELOS LINK IS IDENTICAL IN WEIGHT AND SIZE. INSURES SMOOTH, FULL-POWER DRIVE.
DENSE AREAS IN ORDINARY BELTS CAUSE VIBRATION . . . MACHINE WEAR

1. Balanced construction of Veelos Belts assures you faster, cleaner work, less rejects . . . less bearing wear. Each link and stud is identical in size and weight. Ordinary belts have varying spots of density which cause excess vibration—chatter marks, machine wear.


STROBE LIGHT PIN-POINTS CAUSE OF COSTLY VIBRATION.
YOU CAN SEE IT - MEASURE IT - ELIMINATE IT.
MEASURES VIBRATION DOWN TO 2 MILLIONTHS OF AN INCH. COMPARES THE DIFFERENCE, YOUR ENDLESS BELTS-AGAINST VEELOS.

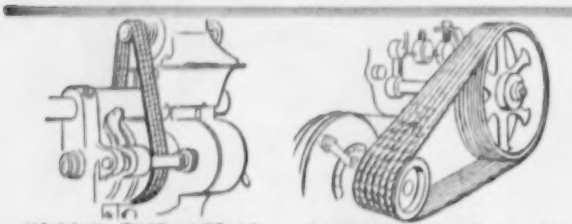
2. Electronic proof—up to 90% less vibration! With a vibration analyzer, you see, on your own machine, how Veelos belts decrease vibration up to 90% over any belt you're now using. This amazing Veelos test pin-points the belt that has the "invisible shakes."



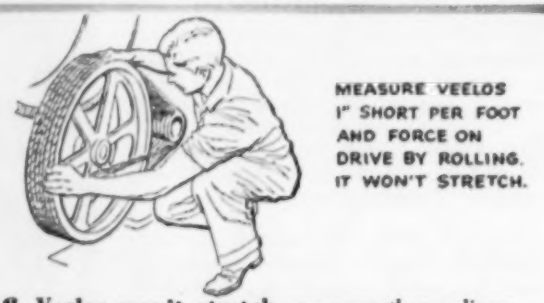
3. Cooler running—long life! Veelos breathes! Constant circulation of air keeps Veelos running smooth. Regular V-belts have no chance to cool, heat builds up from the inside . . . causes slippage, wastes power, heats bearings, reduces belt life.

AREA CONTACT
POINT CONTACT
PERFECT VEELOS FIT. EXTRA THICKNESS AND MACHINE-CUT SIDES PREVENT BOTTOMING. MEAN CONSTANT POWER.
POWERLESS POINT CONTACT OF ORDINARY V-BELT. BULGES, SLIPS, CAUSES UNEVEN SHEAVE WEAR.

4. Greater flexibility reduces slippage! Sectional construction, beveled links allow greater flexibility, longer belt life. Each link moves around sheave independently and maintains full contact, constantly. Full area contact allows shorter centers, smaller sheaves.


NO DOWN-TIME. VEELOS FITS ANY DRIVE - WITHOUT DISMANTLING.
EACH VEELOS BELT CAN BE ADJUSTED - NO NEED FOR EXPENSIVE MATCHED SETS.

5. Simple installation "knocks out" down-time! Saves up to 50% installation time on outboard bearing drives, more when belt length isn't in stock. No resetting, tilting or moving motors. Veelos can be made any length, can be changed by adding or removing links.



6. Veelos won't stretch any more than ordinary endless V-belts when it is properly installed. *Remember—measure Veelos 1" short per foot and roll on drive as tightly as possible.* With the first few revolutions Veelos studs accept a permanent set into the sections they connect.

4 TYPES—FOR ALL DRIVES

VEELOS
THE BALANCED
LINK V-BELT
Known as Veelink outside U.S.A.

For all sizes and types of drives. Double-V available for serpentine drives.

Write for free Veelos Data Book or Veelos Vibration Demonstration to:

MANHEIM
Manufacturing & Belting Co.
410 Stiegel St., Manheim, Pa.

"Industrial Belt Specialists Since 1911"

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SOCKET SCREW PRODUCTS
always measure up!
QUALITY
B-RIGHT-ON
PRODUCTS
Socket screw users who want *what* they want *when* they want it know it pays to specify B-RIGHT-ON! Brighton Socket Screw Products *always* measure up.
Standard or special, Brighton Screws must meet and pass factory standards that are higher even than those specified by the ultimate user of the screws. Rigid control, from initial steel selection to final packaging, certifies every screw as B-RIGHT-ON quality.
Selected mill supply houses, Brighton distributors, complete the control chain, assure the user of service and delivery as dependable as the screws . . . B-RIGHT-ON service.
Write for descriptive literature . . . see how
YOU CAN DO BETTER WITH B-RIGHT-ON.
THE BRIGHTON SCREW & MANUFACTURING CO.
1835 READING ROAD CINCINNATI 2, OHIO

CHIPS DISSTON SAYS

"Be a Sharp Buyer!"

LANCER TOOTH

Use this newly designed Disston hard edge blade with positive rake angle tooth. It permits high-speed production cutting of non-ferrous metal, wood and plastic—cuts brass and aluminum solids and Plexiglas with equal ease.

REGULAR TOOTH

Use this fine Disston hard edge flexible back band saw for all ferrous metals and the thinner sections of non-ferrous metal, wood and plastic. Its finer tooth spacing is particularly adapted to sawing angle iron, steel tubing, nickel plate and brass sheets.

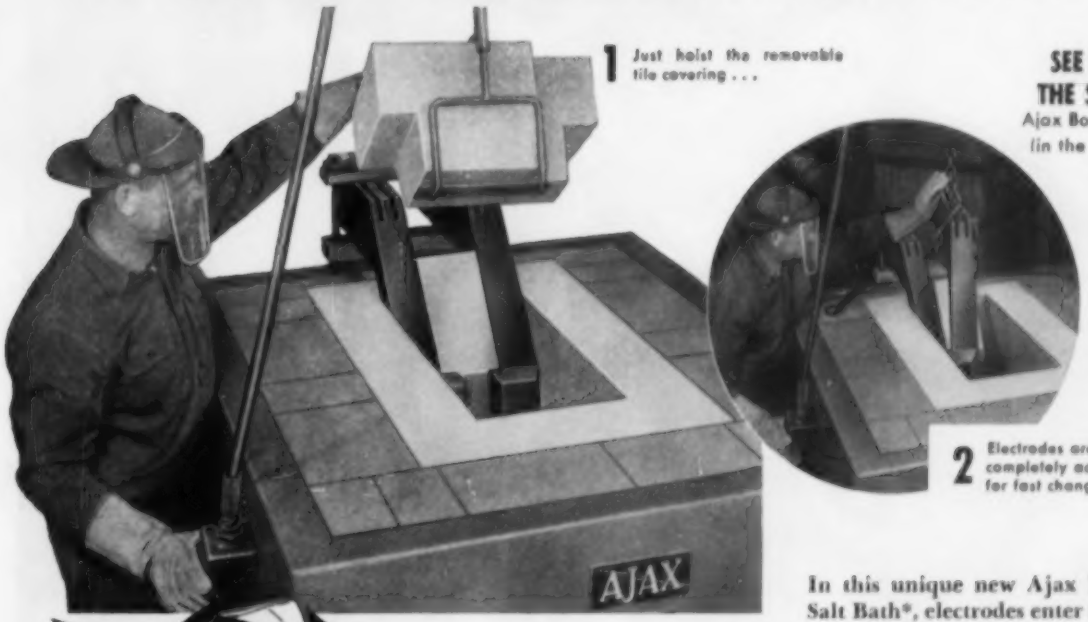
Contact your Disston distributor for these and other high quality Disston cutting tools. Get his expert advice on selecting the right tool for your application.

Henry DISSTON DIVISION
H. K. Porter Company, Inc.
926 Tacony, Philadelphia 35, Pa.

HKP DISSTON

Now! CHANGE SUBMERGED ELECTRODES IN AN HOUR!

. . . without disturbing furnace casing or pot
. . . at substantial savings of labor, material and time



1 Just hoist the removable tile covering . . .

SEE IT AT THE SHOW!
Ajax Booth 1609
(in the Arcade)

2 Electrodes are now completely accessible for fast changing.

AJAX
HYDROMAN
electric
SALT
BATH
furnaces

In this unique new Ajax Electric Salt Bath*, electrodes enter the furnace from over the top, *yet retain all the favorable characteristics of the submerged design.* They are replaced by hoisting a removable tile, putting in new ones and setting the tile back in place.

It's as simple as that! No need to disturb either the pot or furnace casing. "Down time" is held to an absolute minimum. Salt is saved. Spare casings are no longer required. A complete electrode change takes about an hour per pair. Often, the change can be accomplished before the molten salt can solidify.

Write for bulletin giving details of this revolutionary design feature for either new or old Ajax Electric Salt Bath Furnaces.

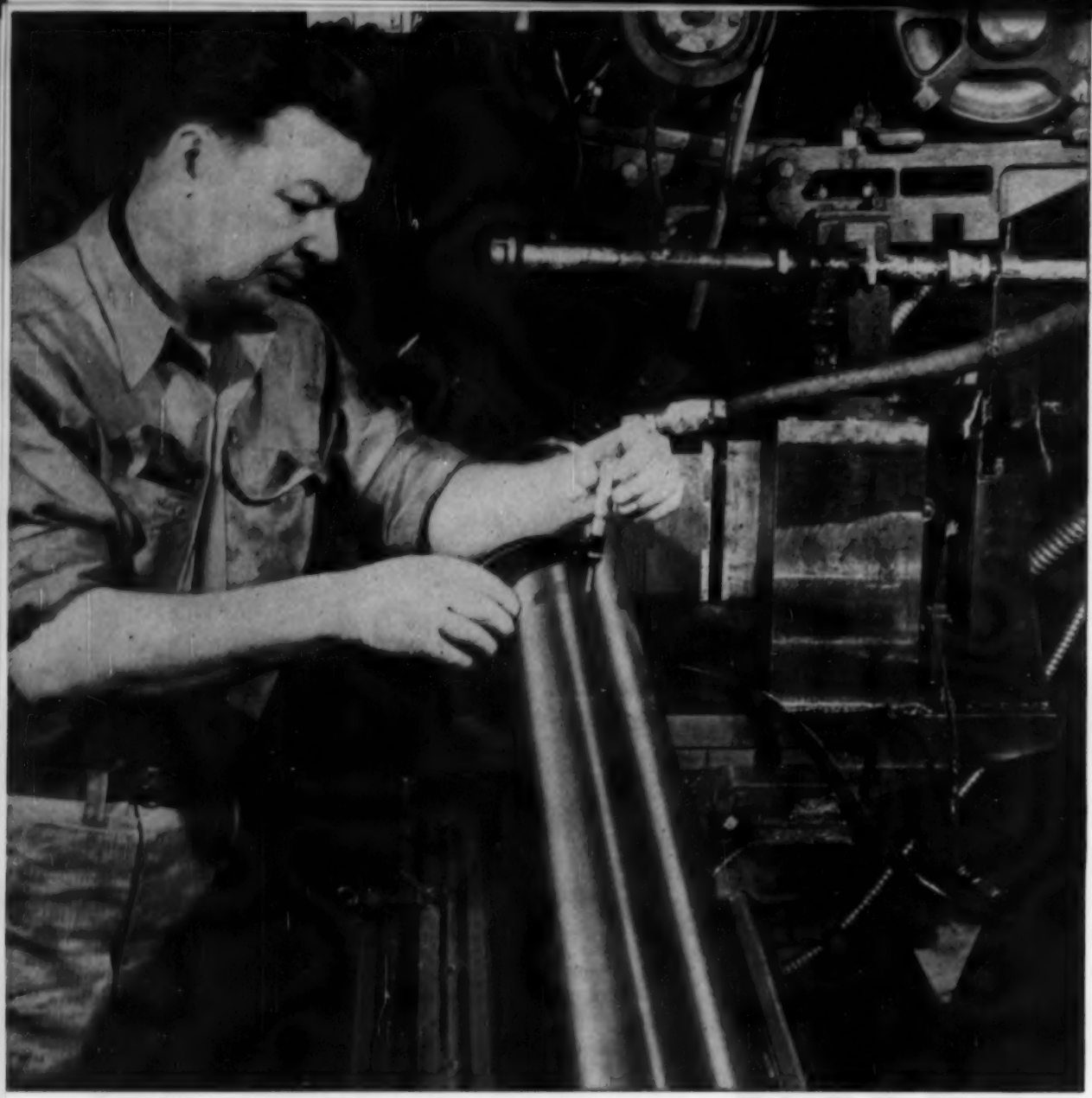
ALL THE ADVANTAGES OF COMPLETELY SUBMERGED ELECTRODE DESIGN!

The removable tile covering seals the electrodes against air, thus giving all the advantages of submerged design including protection against oxidation at the salt line. Life of new type Ajax electrodes using no critical materials compares more than favorably with that of conventional nickel alloy electrodes in conventional-electrode furnaces.

*Patent Pending

AJAX ELECTRIC COMPANY
952 FRANKFORD AVENUE, PHILADELPHIA 23, PA.

Associate Companies: Ajax Electric Furnace Corporation • Ajax Engineering Corporation • Ajax Electrothermic Corporation



Freedom from deep surface defects scores a point for Pittsburgh tubes. Absence of defects holds down rejects, speeds up production.

Steel That Stones Polish

Pittsburgh Steel Tubes Help Ohio Honing Establish Unusual Claim— Firm Hones Hydraulic Cylinders With No Preliminary Machining

Al Blewett, president of the Ohio Honing & Hydraulic Company, proudly claims his Cleveland, Ohio, plant is one of the few in the country where seamless mechanical tubing is honed internally and externally without first being bored, ground or turned.

The details of his technique and special equipment are Mr. Blewett's secret—but he is quick to say that quality tubing from Pittsburgh Steel Company plays an important role.

Ohio Honing, which makes a specialty of honing, uses Pittsburgh tubes to make cylinders for air and hydraulic cylinder customers throughout the United States and Canada. The company processes tubes for some customers and also produces complete air and hydraulic cylinders for other customers to their specifications.

Ohio Honing makes cylinders as small as 6 inches long while its largest cylinders measure up to 30 feet long. The 6-inch cylinder has an in-

(Advertisement)

Internal Honing. The operator is removing .045 inch from this 7½ inch I.D. Pittsburgh tube. The tube is 58½ inches long and has a wall thickness of ⅜ inch.

Before and after internal and external honing. Al Blewett, president of Ohio Honing, left, checks a finished tube with Office Manager Kenneth Sherman.

side diameter of one inch and the 30-foot cylinders have a 24-inch inside diameter.

Mr. Blewett declared the consistent high quality of the seamless mechanical tubing made by Pittsburgh Steel is so important to his operations that he recommends them to customers for whom he does honing work only. Pittsburgh tubes also are his choice for cylinders which he starts and finishes in his own plant.

• Requires "Perfect Finish."

"We must have tubing without defects so that .035 to .045 inch honing will give us a perfect finish," declared Mr. Blewett. "Our scrap on tubes is very low because Pittsburgh Steel tubes are unusually free of defects."

Approximately 7,000 tubes pass through Ohio Honing's plant every month. Many of them get both internal and external honing. Yet the number of scrapped tubes is negligible.

That low rejection rate makes Pittsburgh tubes a prime favorite with Ohio Honing. Mr. Blewett also gives them a high score on concentricity, straightness, and weldability on automatic welders.

"And we can get the tubes we want in standard sizes which are readily available," he pointed out.

Excellent performance in production and high quality in the finished product are assured when you use Pittsburgh tubes in your tubing application. Let Pittsburgh tubes prove themselves on your production line.

Just ask a Pittsburgh Steel representative to call on you or write now for the new tubing handbook.

Pittsburgh Seamless Mechanical Tubing is also available from:

Baker Steel & Tube Company
Los Angeles, California

Chicago Tube & Iron Company
Chicago, Illinois

The Cleveland Tool & Supply Co.
Cleveland, Ohio

Drummond McCall & Co., Limited
Montreal, Quebec, Canada

Edgcomb Steel Company
Philadelphia, Pennsylvania

Gilmore Steel & Supply Co.
San Francisco, California

Earle M. Jorgensen Co.

Mapes & Sprowl Steel Co.
Union, New Jersey

Metal Goods Corporation
St. Louis, Missouri

Miller Steel Company, Inc.
Hillside, New Jersey

A. B. Murray Co., Inc.
Elizabeth, New Jersey

C. A. Russell, Inc.
Houston, Texas

Ryerson, Joseph T. & Son, Inc.
Chicago, Illinois

Solar Steel Corporation
Cleveland, Ohio

Steel Sales Corporation
Chicago, Illinois

Tubular Sales
Detroit, Michigan

Ward Steel Co.
Boston, Massachusetts

Ward Steel Service Company
Dayton, Ohio

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

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Atlanta	Columbus	Detroit	New York	Tulsa
Chicago	Dallas	Houston	Philadelphia	Warren, Ohio
Cleveland	Dayton	Los Angeles	Pittsburgh	

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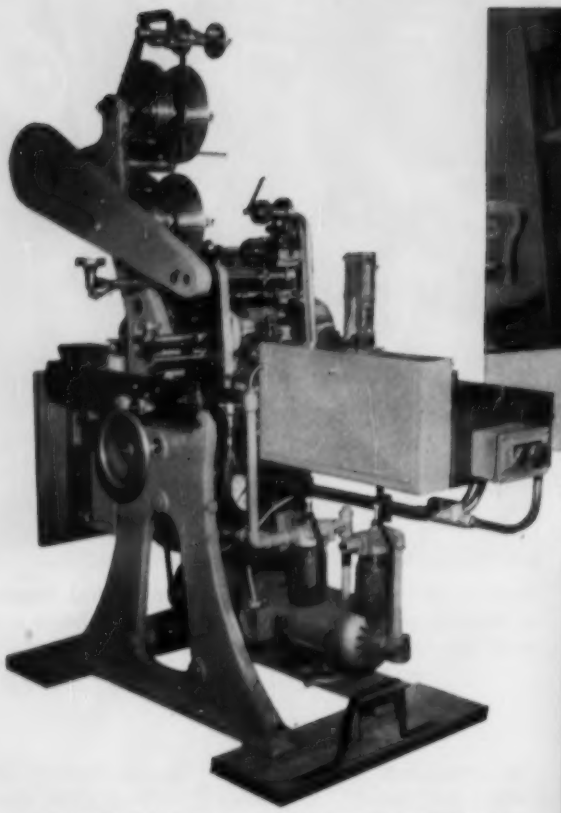
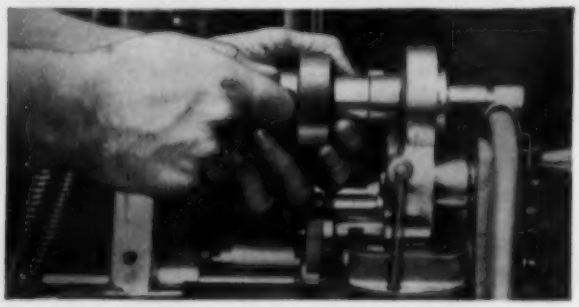


Ready for shipment is one of several hundred high-speed Scandia wrapping machines being built for Phillip Morris for their new Marlboro cigarette packages. These machines depend upon Johnson bearings to help them function smoothly.

John G. Mickens, Purchasing Agent of the Scandia Manufacturing Company, buys thousands of Johnson bearings annually for use in special precision wrapping machines. He says quality is excellent.



Above, Johnson Bearing being installed in high-speed Scandia machine. Close tolerance permits accurate fit necessary for perfect operation.

Scandia Uses Johnson Bearings To Assure Efficiency And Speed Of Precision Wrapping Machines

The production of high speed cigarette-wrapping machines has been a specialty of The Scandia Manufacturing Company of North Arlington, New Jersey since 1918. The company produces, distributes and services about eighty per cent of the machines in use.

"In a situation like this," says Scandia's Purchasing Agent, John G. Mickens, "we're pretty choosey about what goes into our machines. Our customers can't afford a breakdown and neither can we. That is why we use Johnson bearings—a very fine product and their distributor gives us excellent service."

In discussing quality, Mr. Mickens pointed out that the Johnson standard stock bearings they use have very close size tolerances—need little machining to fit perfectly into their machines. He said they never have had a service call as a result of bearing failure and that Johnson bearings last for the life of the machine, which may be as long as twenty years. When special bearings are required, Scandia takes a standard one and alters it by drilling oil holes, reducing the OD or enlarging the ID.

Scandia uses nearly a hundred different sizes of Johnson bearings and buys thousands of them every year from the Johnson distributor in that area. This service is consistently good and bearings are delivered on time even on short notice.

The Johnson distributor in your area can furnish you with these standard bearings from his stock of over 900 sizes. Call him for information on these quality, cost-saving bearings and other standard bearings. Johnson Bronze Company, 550 S. Mill Street, New Castle, Pa.

Johnson Bearings

Pangborn Rotoblast Table-Room at Worthington Corporation, Holyoke, Mass., "reduced two full shifts to one shift daily . . . gives perfect finish, cleans 2½ times faster than previous equipment."

Pangborn Rotoblast® gives "perfect" finish at Worthington Corporation!

And "cleans cleaner than pickling acid" at Brydon Brass!

Rotoblast Blastmaster® Barrel at Brydon Brass Mfg. Co., Toronto, Canada, "cleans cleaner than pickling acid . . . we're enthusiastic and completely endorse the cleaning quality."

Industrial parts today must have a high quality finish for many reasons—production facility, operating efficiency, consumer demand. Pangborn Rotoblast gives such a finish—thoroughly cleaned, uniform—and does it *quickly*. As a result, you get a top-notch cleaning job and greatly increased production with lower operating, labor and reject costs. Write for further details to see what Rotoblast can accomplish for *you*. Send for Bulletin 227 to PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning and Dust Control Equipment.*

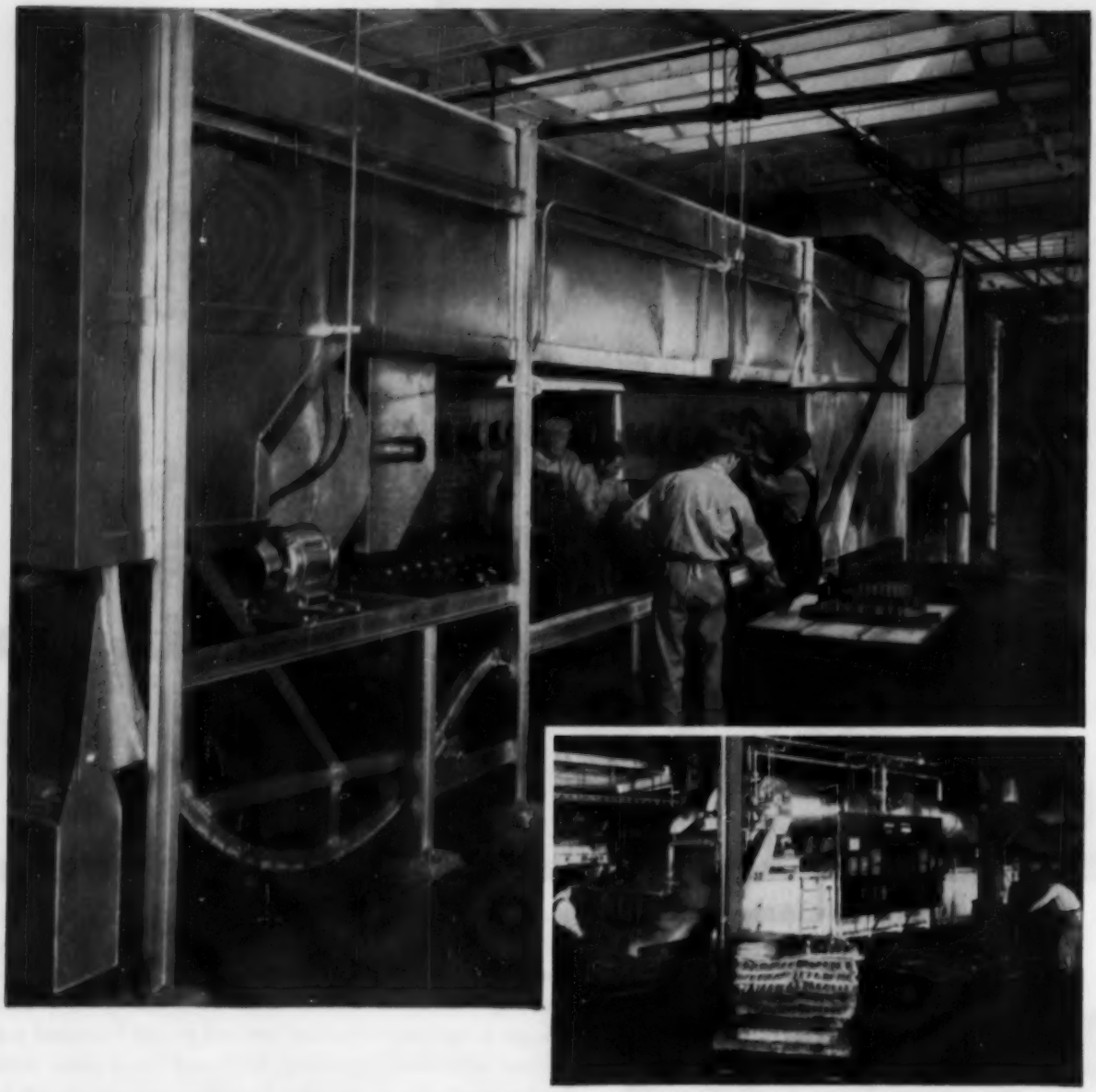
Visit our Booth 8 to 12, Iron & Steel Exposition, Cleveland, September 25 to 28

Pangborn

BLAST CLEANS CHEAPER

Rotoblast Blastmaster® & Continuous-Flo Barrel | Rotoblast Tables & Table-Rooms | Special Blast Rooms & Cabinets | Pangborn Dust Control Equipment

Distributors for Wheelabrator and Tru-Steel Abrasives



"Production time slashed from minutes to seconds . . . thanks to *GAS*"

In this Gas-fired bonding oven at Laher Spring and Tire Corporation, Oakland, California, brake linings are molded to brake shoes under pressure. With their modern Gas-fired equipment, Laher turns out six times as many brake sets as they did with their old equipment—with pronounced savings!

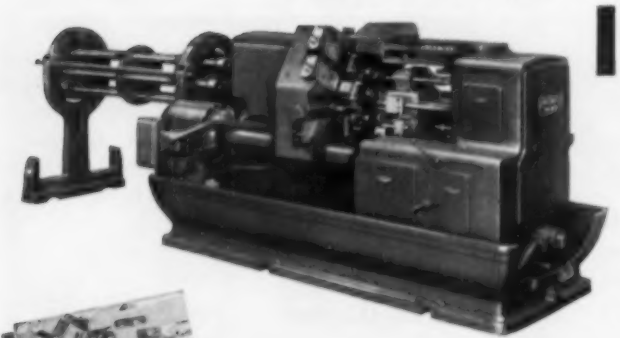
To develop this two-line inverted furnace, Laher worked closely with Heat and Controls, Inc. and the local Gas company. The result was an efficient, compact oven and production line that cut production time from minutes to seconds. What's more, the adhesion is many times stronger, giving a better product.

The advantage of Gas is already apparent at Laher. For information on how Gas can help you in your production operations, call your Gas Company's industrial specialist. He'll be glad to discuss the economies and results you get with Gas and modern Gas-fired industrial equipment. *American Gas Association.*

1. Simplified cross-slide camming
2. Interchangeable cross-slide tool holders
3. Quick-adjusting stroke mechanism
4. Rapid speed and feed changes
5. Wide-open, easily reached tooling area
6. Built-in threading feed and drive
7. Easily accessible main toolslide holders
8. Stationary type collets changed quickly

eight big reasons why you get *Fast Setups* on GREENLEE BAR AUTOMATICS

In plant after plant countless hours of setup time are saved each year on Greenlee Bar Automatics. Similar savings in time and money can be achieved in your own plant. Greenlee has on-the-job case studies to prove it. Whether your responsibility lies in the field of management . . . production . . engineering . . . or purchasing you owe it to yourself and your company to call in the Greenlee man. Let him show you why and how faster setups on a Greenlee pay off in greater profits.



PRODUCTION MACHINERY
GREENLEE

4-SPINDLE...6-SPINDLE
SECOND-OPERATION
PNEUMATIC STOCK FEED

WRITE TODAY FOR CATALOG A-405

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GREENLEE BROS. & CO.
1929 Mason Avenue
Rockford, Illinois

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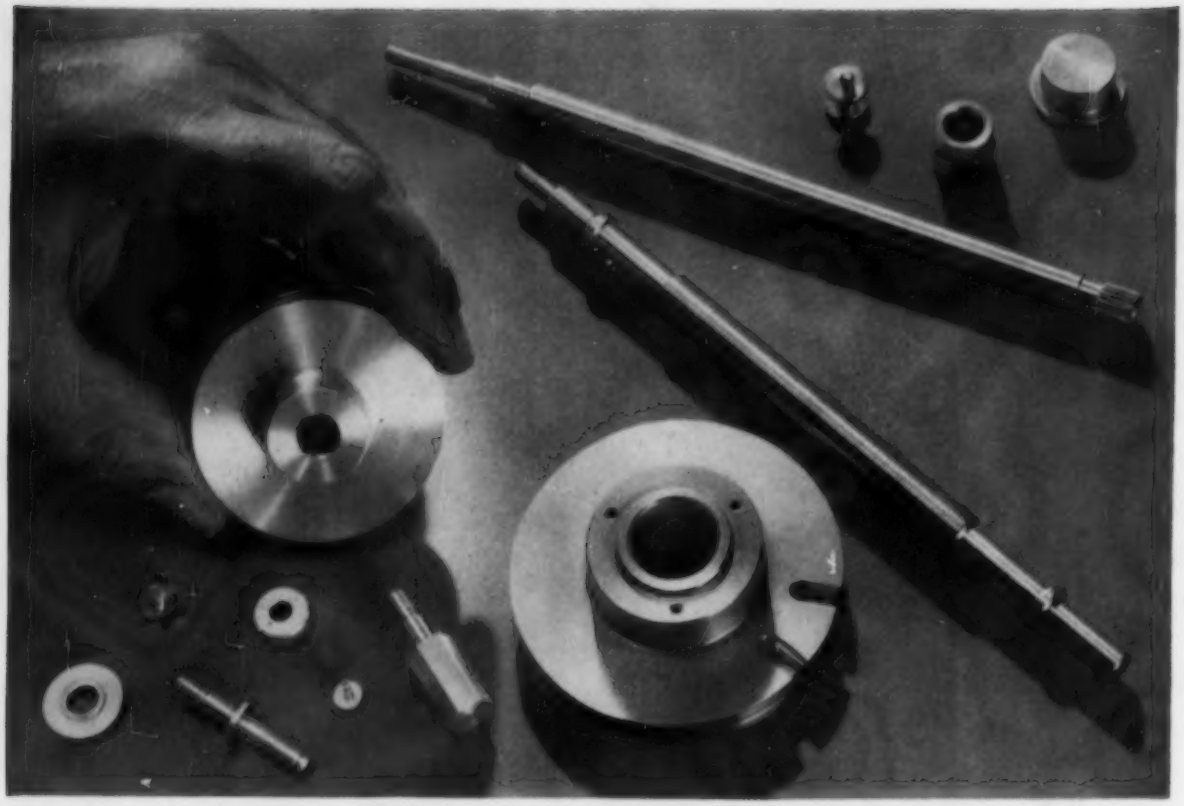


TYPICAL PARTS made of Alcoa Aluminum Screw Machine Stock at Dictaphone Corporation include long, slender feed screws that used to present threading problems in steel. Tolerances of three tenths are not unusual. High stock removal is routine with aluminum.

HOW DICTAPHONE CORPORATION* DESIGNS FOR SALES WITH ALCOA ALUMINUM SCREW MACHINE STOCK

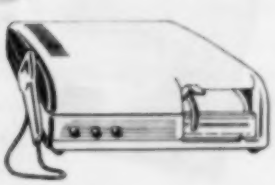
The day the dictating machine left the office and started traveling with the salesmen, surprising things happened. At Dictaphone Corporation, for example, their famous Time-Master dictating machine went on a reducing diet. From 20 pounds, this versatile machine shrank to 12.4 pounds. Aluminum screw machine parts played a major role in making the Time-Master light and portable. But, most important are the other advantages that came to Dictaphone with their switch to Alcoa® Aluminum. "Problem parts" in stainless and mild steel suddenly became routine when Alcoa Aluminum Screw Machine Stock was used. Tool and wheel life increased. Rust problems ended.

While weight reduction may not be the primary consideration for your product, the economic savings and many added advantages of aluminum can solve other problems. Low material costs (three times as many pieces from each pound), excellent machinability, ease of finishing and high resistance to corrosion will make Alcoa Aluminum Screw Machine Stock your choice for non-rusting parts. If you need high heat or electrical conductivity, aluminum has these, too.

These facts practically dictate a hard look at aluminum for the majority of your screw machine parts. To help you take that look, qualified screw machine experts are available at your local Alcoa sales office listed under "Aluminum" in your classified phone book. Aluminum Company of America, 874-J Alcoa Bldg., Pittsburgh 19, Pa.

*

Dictaphone



Mr. J. S. Decker, Mr. E. J. Kwantz and Mr. J. S. Kemp (left to right) discuss purchase of materials for Dictaphone's new Time-Master.

Mr. T. Chanoux (standing) talks over the design of a Time-Master part with Mr. W. G. Deschenaux.

On-the-job production conference between Mr. S. J. Redmond and Mr. J. A. Gunger.

IN PURCHASING

Mr. E. J. Kwantz, Buyer, says, "One reason we do business with Alcoa is because they study our problems and make helpful suggestions. In cases of extremely tough delivery requirements, Alcoa expedites quickly from their mills and warehouses. Availability and quality are big advantages in buying from Alcoa. We find scrap disposal easier with aluminum than with steel."

IN DESIGN

Mr. Theodore Chanoux, Chief Production Engineer, says, "Five years ago we would have been astounded at what we are doing with aluminum today. In addition to weight savings, aluminum screw machine stock helps us solve other design problems. Acme threads were impossible in stainless parts; they're simple with aluminum. Where we have to specify plating or other special finishes for ferrous parts, simple anodizing of aluminum saves us money. Some of our machined parts are bearing surfaces. Here, too, aluminum performs well."

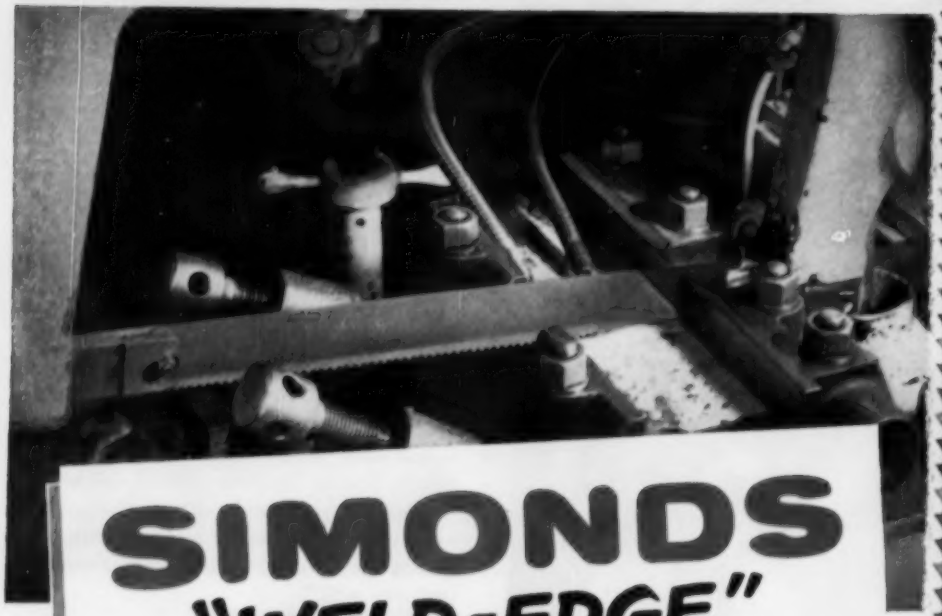
IN PRODUCTION

Mr. Matthew Luciani, General Foreman, says, "We can chase an Acme thread on aluminum with two passes compared to six or seven with stainless steel. Tool and wheel life is longer. Lubricants used with aluminum don't get rancid and smelly. Our operators like this, and they like the fact that aluminum chips don't cut them. We make about 80 aluminum parts for the Time-Master at tremendous production savings. We run machines at top speeds and feeds. The parts don't rust in storage."

Your Guide to the Best in Aluminum Value

SHATTERPROOF...

for Maximum Safety . . . Yet Rigid Enough to Maintain Straight Cutting!



SIMONDS "WELD-EDGE" Power Hacksaw Blade

with The High Speed Steel Cutting Edge

This Simonds-Engineered Blade with its factory-controlled weld is especially designed to meet all plant safety and performance requirements — with real savings in time and cost per cut.

Simonds "Weld-Edge" Hacksaw Blades are *tough* — will not snap in operation regardless of abuse, neglect, machine condition or adjustment. These blades have a High Speed Steel cutting edge that resists wear and is adaptable for all types of cutting.

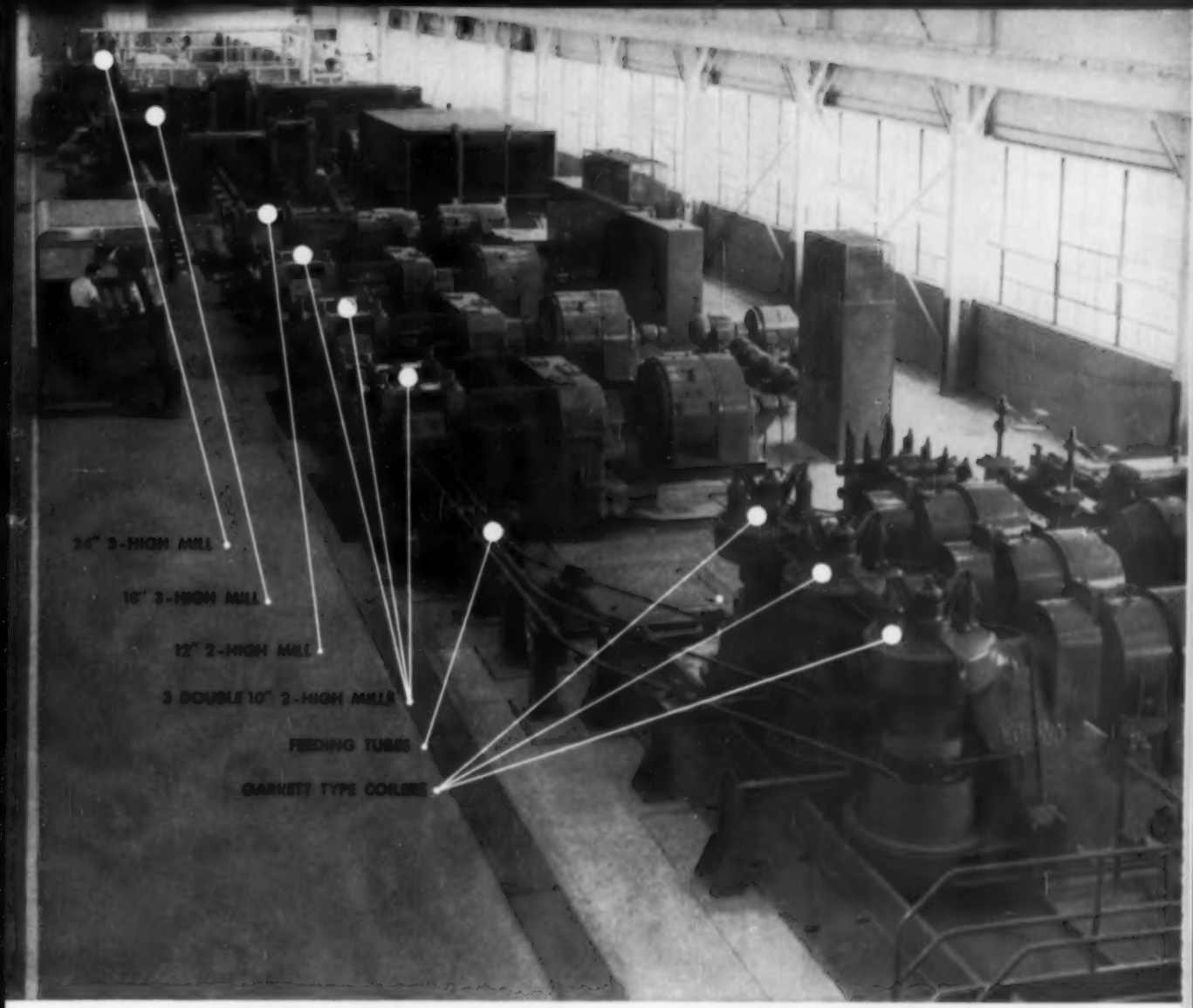
What's more, "Weld-Edge" Blades have a specially heat treated back that is not only shatterproof but possesses greater rigidity that pays off in straighter cuts and longer life.

For safety, dependability and increased output at lower cost, ask for SIMONDS "Weld-Edge" — the shatterproof blade with the Red End. All standard sizes available from stock.

SIMONDS
SAW AND STEEL CO.
FITCHBURG, MASS.

For Fast Service from Complete Stocks Call your
SIMONDS Industrial Supply DISTRIBUTOR

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon, Canadian Factory in Montreal, Que., Simonds Divisions: Simonds Steel Mill, Lockport, N. Y., Heller Tool Co., Newcomerstown, Ohio, Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada



This installation has a capacity of 40,000 lbs per hour for 2-strand rolling with finished coil delivery every 19 seconds.

new Loewy copper wire rod mill reduces wire bars to 5/16" wire rod, automatically

At the plant of a leading manufacturer of electric cable, this new Loewy mill is rolling 5/16" and 7/16" copper wire rod from standard wire bars in a continuous, fully automatic operation.

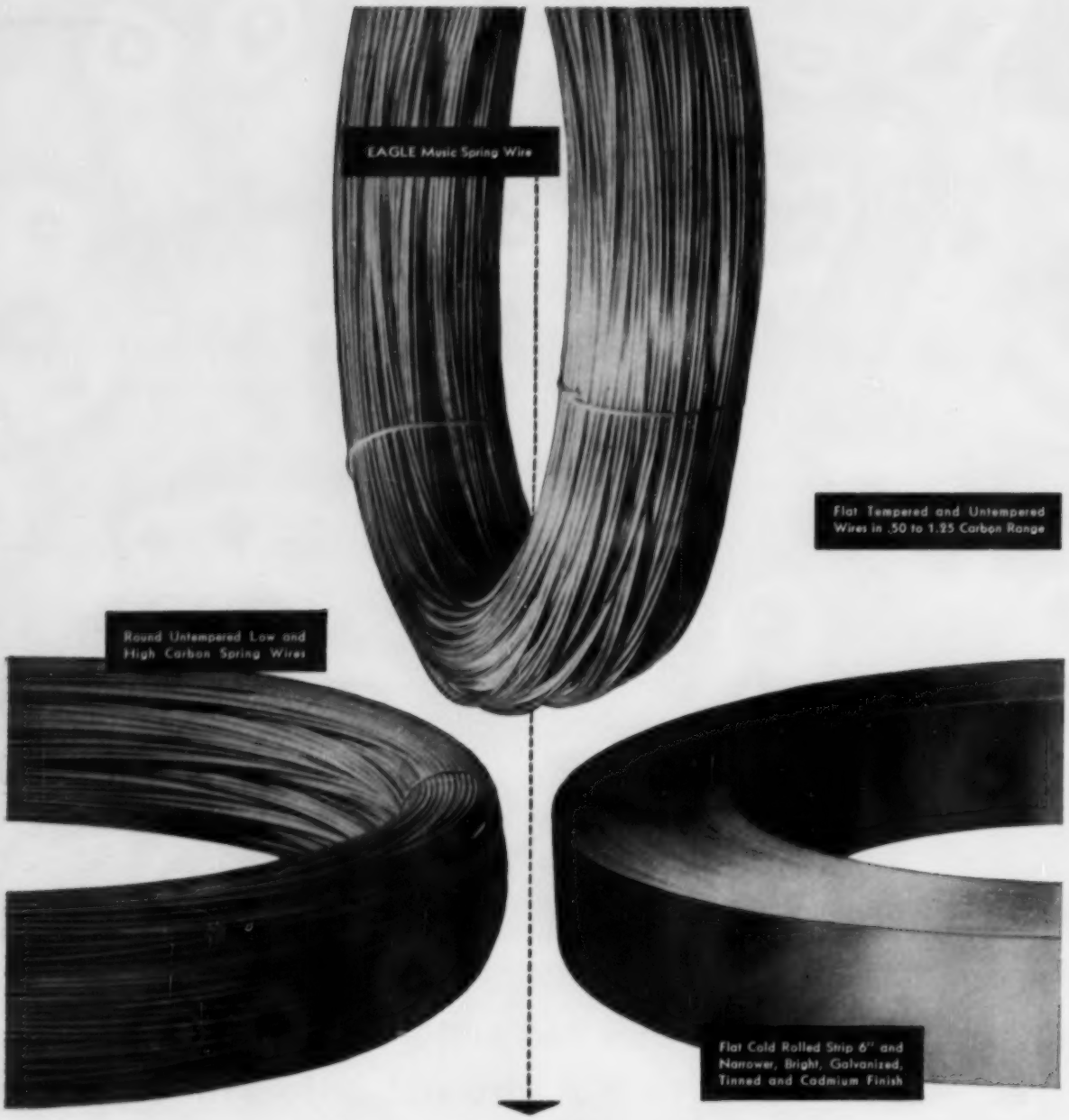
The mill consists of two 3-high roughing mill stands, seven continuous finishing stands and three Garrett coilers. Copper wire bars are conveyor-fed into the furnace. After leaving the furnace the ingots are rolled down in 14 passes to finished size. Leaving the last stand at a speed of 2400 FPM the wire is coiled. The coils are tied and conveyed into a pickling line. The entire procedure is automatic and all operations are controlled from one operator pulpit.

Like this high-speed wire rod mill, all Loewy equipment is designed to produce more, in less time, at lowest cost. We design, build and install blooming and slabbing mills, plate mills, structural and rail mills, bar and skelp mills, continuous billet and strip mills for ferrous and non-ferrous metals as well as high-speed foil mills. For illustrated bulletin 14002, write Dept. 246, Loewy-Hydropress Division, BLH Corporation, 111 Fifth Avenue, New York 3, N.Y.

BALDWIN BLH LIMA-HAMILTON

LOEWY-HYDROPRESS
BALDWIN-LIMA-HAMILTON

DIVISIONS: Austin-Western • Eddystone • Hamilton • Electronics & Instrumentation • Lima • Madsen • Loewy-Hydropress • Pelton • Standard Steel Works


EAGLE Music Spring Wire
Flat Tempered and Untempered Wires in .50 to 1.25 Carbon Range
Round Untempered Low and High Carbon Spring Wires
Flat Cold Rolled Strip 6" and Narrower, Bright, Galvanized, Tinned and Cadmium Finish

Here is the Washburn Wire Family made to your specifications to insure the Quality of YOUR Product

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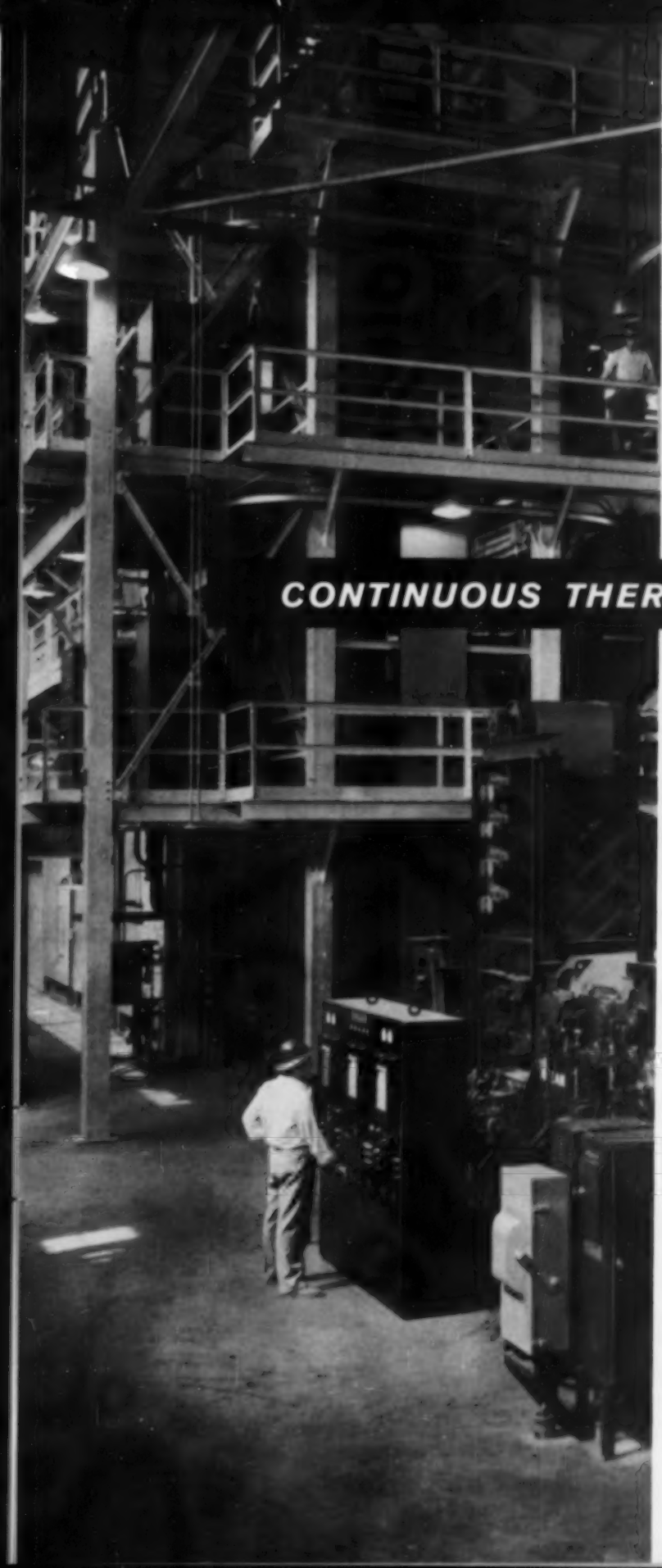
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES



CONTINUOUS THERMAL PROCESSING...

more steel... improved quality!

A significant first in the steel industry has resulted from the recent installation of three new and identical annealing lines, each designed to deliver 20 tons of improved-quality silicon steel per hour.

This continuous annealing operation in a limited area created an unusual problem in control accuracy and reliability. Westinghouse MAGAMP* magnetic amplifier regulators form the heart of the control system . . . make this the first all-magnetic amplifier continuous annealing line. Westinghouse furnished complete electric equipment and furnaces for all three lines.

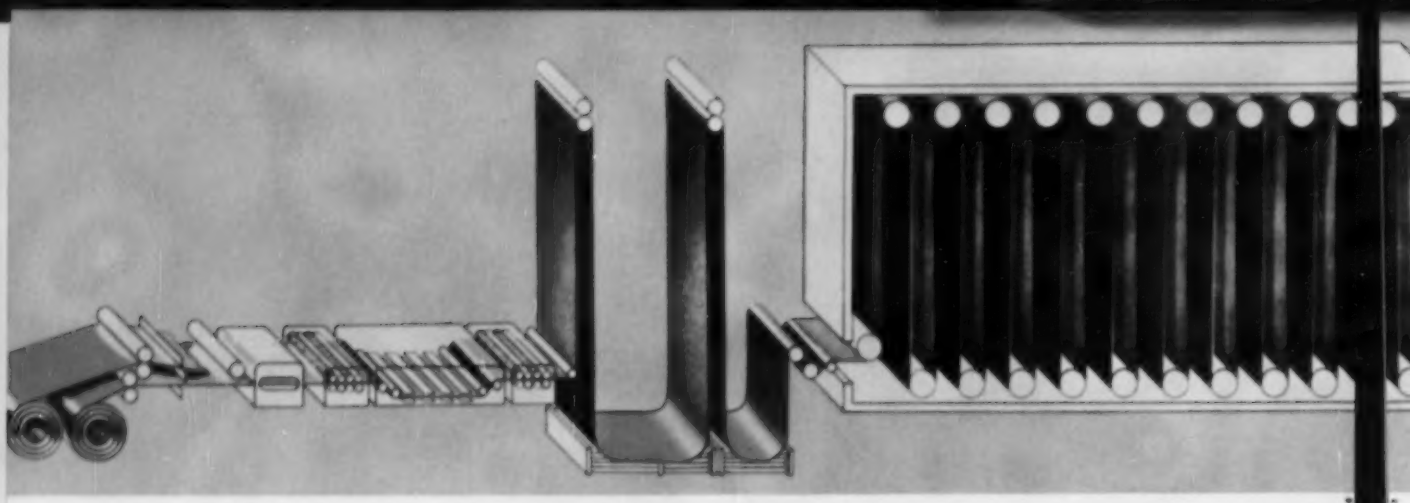
And . . .

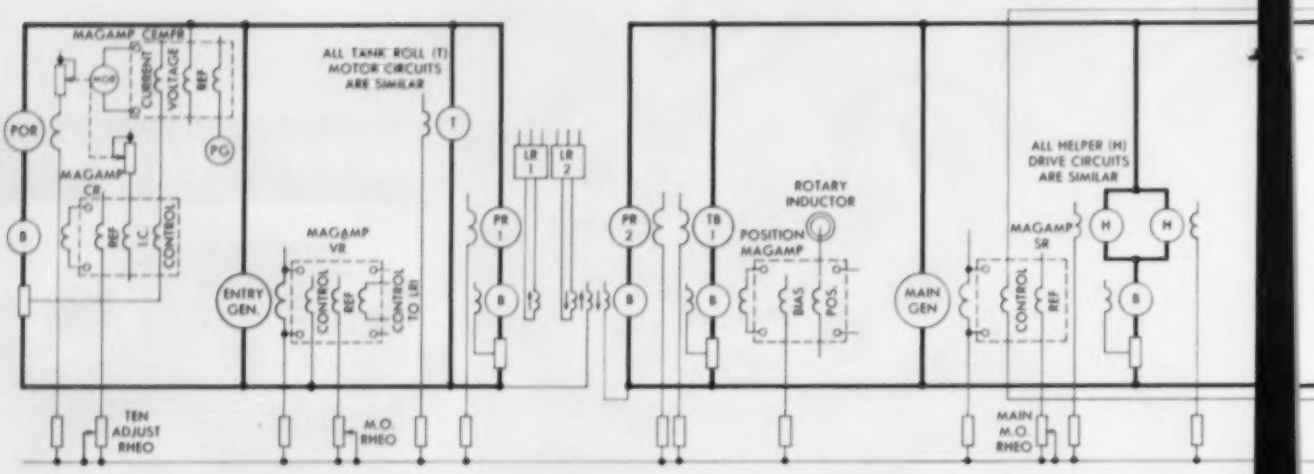
Here's another big development in the steel industry →

*Trade-Mark

WATCH WESTINGHOUSE!

WHERE BIG THINGS ARE HAPPENING TODAY!





Tin-plate annealing equipment designed for . . .

Process speeds beyond 2000 fpm, output 60 tons per hour!

Tin-plate annealing lines now being built will be capable of boosting output as much as 100% over existing continuous lines.

Continuous annealing lines are from 300 to 400 feet in floor length. Since the strip travels through many vertical passes, several thousand feet of tin plate are accommodated in the line between the pay-off and winding reels.

High-speed annealing operations like this demand the ultimate in coordination and reliability. Westinghouse motors, controls, furnaces and related equipment will help you handle speed and output up to and beyond 2000 fpm, 60 tons per hour—while maintaining precise quality standards. Moreover, Westinghouse accepts full unit responsibility for the electric and furnace equipment installed in your line.

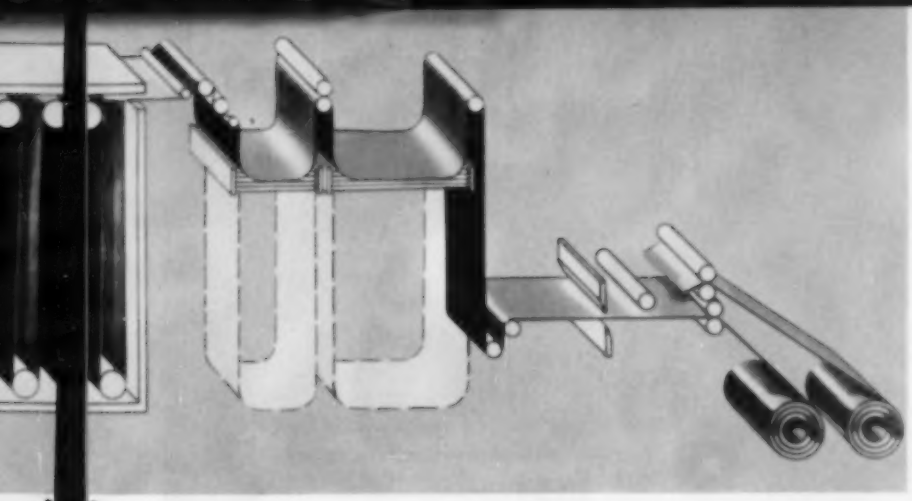
How Line Control Operates

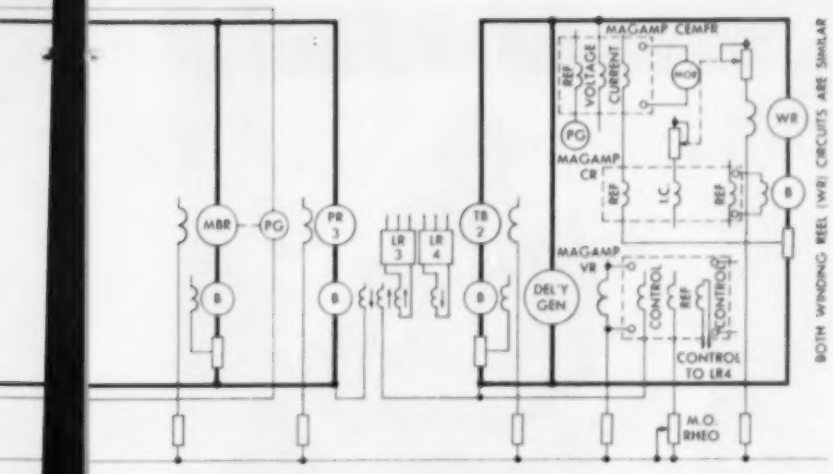
Westinghouse has many years of successful experience applying MAGAMP regulators to drive systems. Above diagrams show how Westinghouse MAGAMP regulators are applied in modern, continuous annealing lines.

MAGAMP speed regulator (SR) maintains constant speed through the critical annealing zone. Speed reference, set by main motor-operated rheostat (MOR), is

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***





balanced by the control winding fed from the pilot generator (PG) driven by the master bridle roll (MBR).

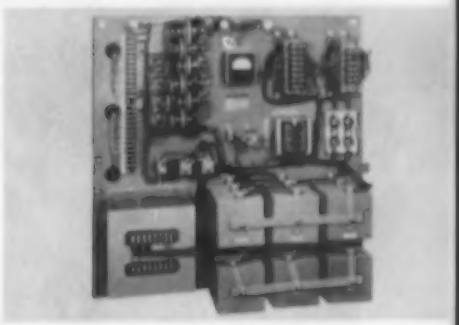
MAGAMP voltage regulators (VR) control the voltage of the entry and delivery generators assuring fast, even acceleration and deceleration and a minimum of loop disturbance during steady operation. Loop regulators set as verniers in controlling generator voltages.

MAGAMP current regulator (CR) for booster, and MAGAMP counter-EMF regulator (CEMFR) for motor, work together so regulated tension is maintained by the pay-off reels (POR) and winding reels (WR). Inertia compensation (IC), proportional to accelerating loads, and stall tension signals are introduced through the (CR) circuits.

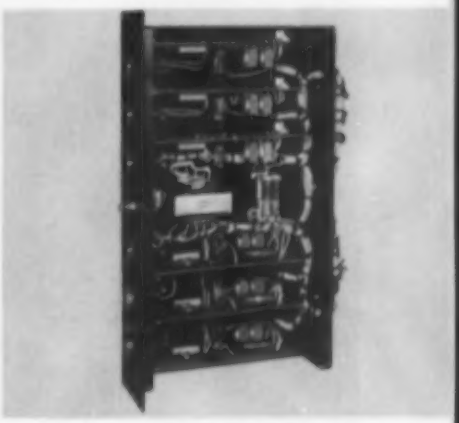
Photo-thyratron loop regulators (LR) provide modulated control of storage loops for smooth operation.

Machine characteristics are selected for best drive performance. Pinch roll no. 1 (PR-1), master bridle roll (MBR), and tension bridle no. 2 (TB-2), the pacesetters of their respective line sections, are shunt-wound for flat, speed-load characteristic. Helper drives (H) have high drooping characteristics which result in their developing only the power required to overcome their friction losses and inertia loads. Reel motors have high overload capacities suitable for accelerating the large coils which are now used in most mills.

Centralized line control reduces space requirements and provides ready accessibility for inspection.



Magamps bring outstanding precision, dependability to line control . . . no moving parts, brushes, commutators, bearings.



New Westinghouse fault finder monitors control circuits simultaneously, indicates faults instantly and makes trouble-shooting easy.

Westinghouse d-c motors perform efficiently under tough conditions. High starting torque ideal for high inertia loads.

Westinghouse continuous furnace anneals eight tons per hour of silicon steel at 184 fpm and stress relieves 20 tons per hour at 460 fpm.

Three ways Westinghouse furnaces match increased annealing speed

Westinghouse gas and electric furnaces meet the demands of today's high-speed thermal processing and annealing lines three ways:

Construction—furnace layout compensates for thermal expansion. Maximum accessibility provided for convenient replacement of burner and heating element panels and rethreading.

Temperature Control—Typical examples are: proportioning-type controls to regulate recuperative radiant tubes in gas-fired furnaces; Furnatron® regulators to maintain constant temperatures in electric furnaces.

Atmosphere—Westinghouse atmosphere generators provide controlled and protective atmosphere which maintains product quality at higher speeds. Strip is produced flatter, more uniform . . . surface is cleaner.

Westinghouse consulting, application and design engineers can speed equipment installation, eliminate problems right from the start. They help match correct products to the job, test them to assure proper operation.

From planning or problem, to design, installation and start-up . . . Westinghouse is at your service. An experienced Westinghouse team will work with your engineering staff and consulting engineers in setting up your thermal process line.

For your convenience . . . 38 manufacturing and repair service plants superbly equipped for repairing all types of electric apparatus . . . 34 renewal parts warehouses strategically located in industrial centers, open 24 hours a day.

Contact your Westinghouse sales office for further details. Ask for a copy of B-6072, *Westinghouse Drives for Processing Lines.* Or write, Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania.

MP-3044

Completely self-adjusting, magnetic, d-c motor brake assures safer, more positive stops and starts. Maintenance and replacements minimized.

Westinghouse engineers help you plan installations like this compact a-c control center for fans, pumps and other auxiliary equipment.

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***

PROFIT!

National Metal Exposition And Congress

PUBLIC HALL
CLEVELAND, OHIO

Oct. 8 thru 12

You'll earn and learn much more than the cost of your visit to the Metal Show. **You'll see nearly 500 exhibits** showing the most modern and cost-cutting ideas in the metals field. It'll be like a grand tour of the metals industry, which would take months to see in any other way.

You'll learn profitable ideas that will contribute to your future planning in many important ways. That's why this year's Metal Show is a must for management men, engineers, production and purchasing men **in your plant** . . . in fact, anyone you know who is concerned with metals should see this show and sit in on the sessions.

MORE THAN 100 TECHNICAL PAPERS are scheduled. Specialists will discuss their most recent findings. They will tell you what's new and coming in the metals field and how you can profit most from these modern achievements.

For the ideas you'll gain . . . for greater profit in the future . . . for all you'll see and learn . . . attend the 1956 Metal Show at Cleveland's Public Hall.

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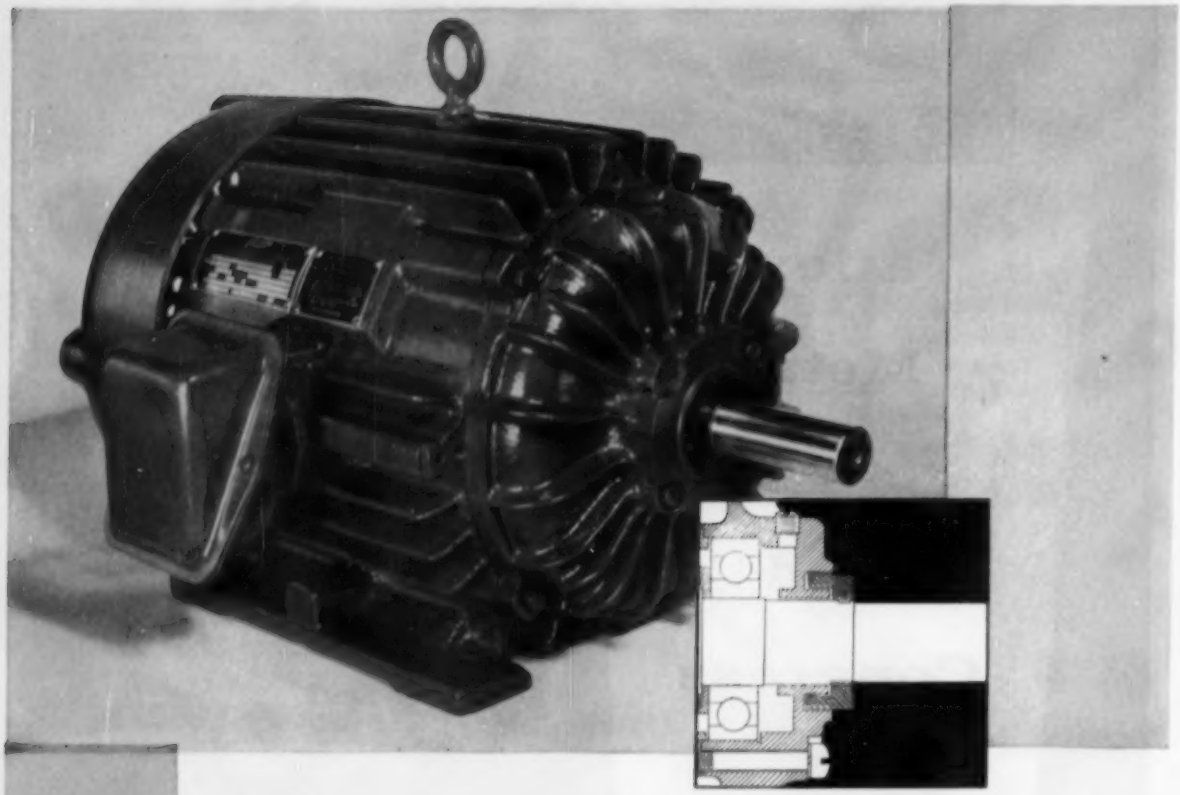

Securely sealed for low maintenance —

Century TOTALLY ENCLOSED FAN COOLED MOTORS

When motor maintenance goes down, production goes up. Century TEFC Motor *protects itself* from dust, grit, chemical fumes, moisture. Shaft openings at each end are labyrinth-sealed, and there is a precision clearance between metal seal and bearing bracket.

Outside, a hose or whisk broom quickly cleans it. External fan forces jets of cooling air across the frame. Inside, vital motor parts are completely sealed off from injurious atmosphere. Factory lubrication of bearings is adequate for several years' service under normal conditions; however, whenever required bearings may be relubricated through grease plugs.

For full facts on your specific application, call the Century District Office or Authorized Distributor nearest you.

CENTURY . . . building TEFC Motors for 25 years

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Performance-Rated®
MOTORS
1/20 to 400 H.P.

CENTURY ELECTRIC COMPANY

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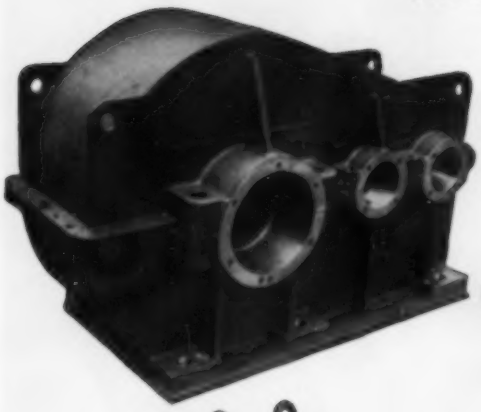
Case History No. 32 • SPEED REDUCER HOUSING



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2 GRAY IRON CASTINGS

Plus **. . . 73% saving on cost of unmachined pieces.**

Plus **. . . 20% saving on machining cost.**

The performance of the Gray Iron casting is superior to the assembly, because of Gray Iron's ability to absorb vibration. Furthermore, this characteristic provides the added dividend of quieter operation. Savings on the first three units made up the difference between pattern costs and template costs.

Look at the two housings. Consider appearance plus savings. Can there be any question about which is the better buy!

Somewhere in your plant, there must be a place where use of Gray Iron will save you money and improve your product.

For specific technical and business information, write direct to Gray Iron Founders' Society, Inc., National City—East 6th Building, Cleveland 14, Ohio.

This symbol assures you the most for your casting dollar

Here's why it pays to call in one of the more than 500 leading foundries displaying the Society symbol:

- The most recent technical and business information is available to each member through the Society to help you design better products at lower cost.
- The use of sound cost accounting procedures is recommended and encouraged among Society member foundries, assuring full value for your casting dollar.
- Improved castings result from the advanced techniques and the high sense of responsibility of Society members.

MAKE IT BETTER WITH GRAY IRON

GRAY IRON FOUNDERS' SOCIETY

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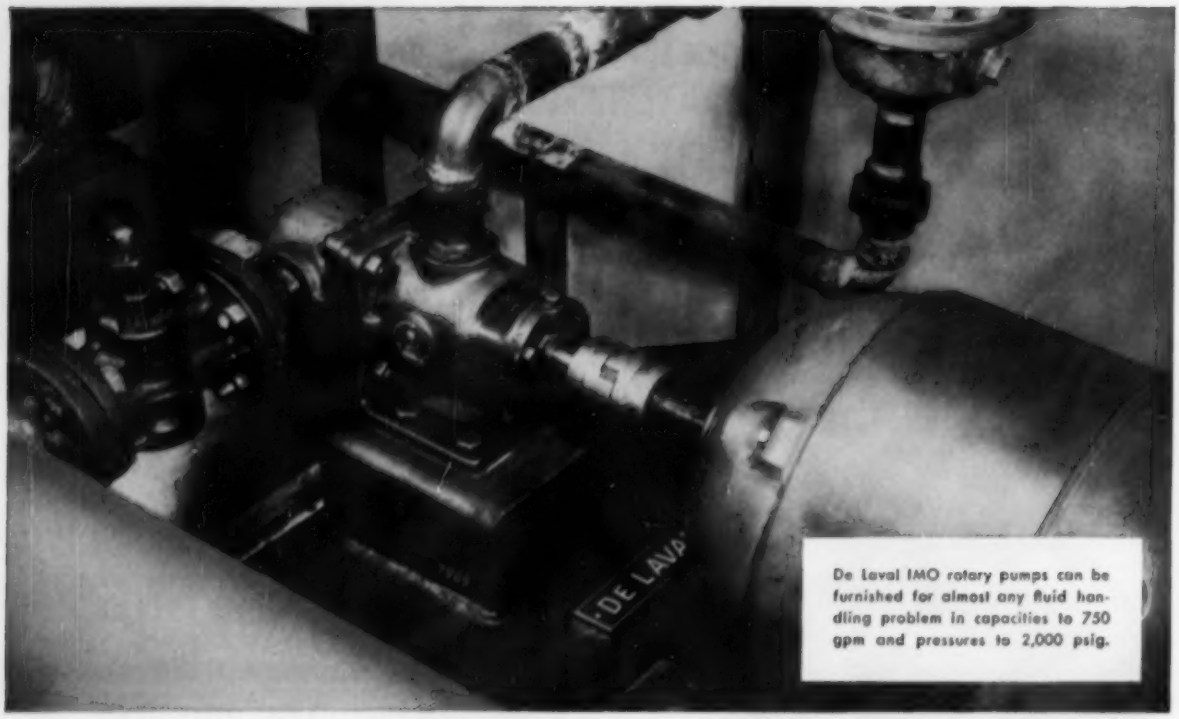


De Laval IMO rotary pumps can be furnished for almost any fluid handling problem in capacities to 750 gpm and pressures to 2,000 psig.

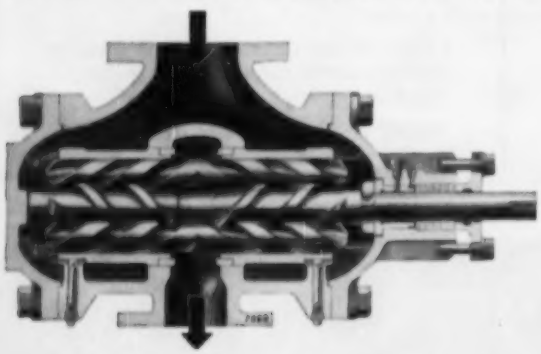
What to Look for in a Rotary Screw Type Pump

By W. J. MONGON, *Assistant Chief Engineer*
De Laval Steam Turbine Company

A sound knowledge of design, and how it affects performance, is the best insurance a buyer can have that he will get the pump he needs. This brief analysis of the IMO, a rotary three-screw pump manufactured by the De Laval Steam Turbine Company, will give you some of the necessary facts.

What qualities should you look for in a rotary type pump? It must, of course, meet specified capacities and pressures. But, it must also be efficient, operate quietly, stay on the job.

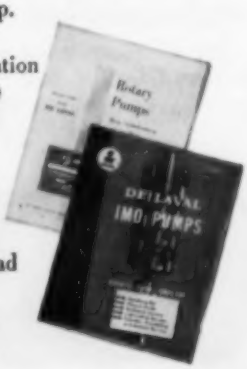
The axial flow of a screw type pump, and the resulting low inlet losses for any given pump speed, are important benefits that should be considered in making pump selections. The absence of timing gears and other mechanical features of construction also enable the De Laval IMO pump to operate at direct-connected motor and turbine speeds . . . to handle viscous liquids and high suction lifts.



This is a cross-section of the De Laval IMO Series A322A, a positive displacement rotary screw type pump.

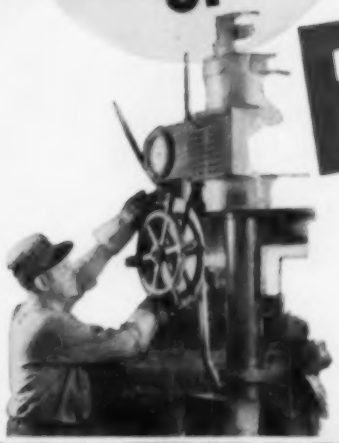
One of the most important features of the IMO pump is the hydraulic turning of the idler or sealing rotors. The central or power rotor is the pumping element; the liquid pumped turns the sealing rotors.

A screw type pump is well suited for applications where pulsation-free flow is desirable. The axial flow of the liquid without trapping and the unique thread form which keeps closures fluid-tight contribute to quiet operation of the IMO pump.

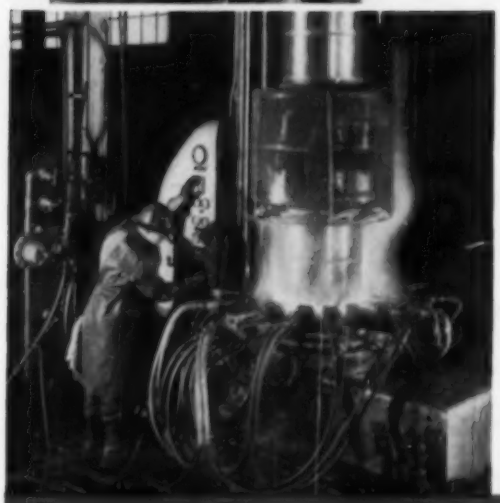


Catalog LS gives useful application and specification data on the IMO pump. An article titled, *Rotary Pumps, Basic Considerations in Their Application*, contains a description of rotary pumps in general. For these publications, write on your company letterhead to De Laval Steam Turbine Company, 860 Nottingham Way, Trenton 2, New Jersey. DL-301

YOU CAN'T BEAT THE COMBINATION OF SKILLS and EQUIPMENT



...which ONLY the Commercial Heat Treater can provide



Today's modern commercial heat treating plant might well be described as a "department store" for metal treating services. For under one roof are offered you not only the full range of heat treating equipment for all types of processes . . . but . . . of still greater importance, the manpower skills of the management and technicians of those supervising and performing your jobs. *Service* is their keynote.

Whatever your needs . . . whenever you need it . . .

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This metallurgist—who is responsible for the quality of our rope wire—is with your Wickwire Distributor every time he makes a call.

True, he's physically in his laboratory, supervising the thorough testing *of both ends of every coil* of wire to assure uniformity throughout the coil. But, whenever your Wickwire Distributor calls, he has the full assurance that metallurgists like this are constantly making sure that the product has the right chemical and physical properties to give long, dependable service.

It's just one more reason why your Wickwire Distributor knows he's got top-quality wire rope, slings and strand to sell . . . and that these products will serve you well.

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For improved O-H combustion practice...

Record O_2 Reliably, Heat after Heat

Key to continuous, reliable records of oxygen in open-hearth exhaust gases is the unique L&N sampling system. Self-flushing, self-cleaning, this assembly delivers a thoroughly scrubbed sample of waste gas to the L&N Magnetic Oxygen Analyzer under positive pressure, without mechanical pumps or aspirators . . . and with very little maintenance.

Spray-flushing of the probe opening and internal passages prevents slag buildup and dirt accumulation. The sample gas is drawn from the water-jacketed, stainless steel probe by a steam jet assembly. Expansion of steam accelerates the gas to a high velocity; condensation of the steam scrubs the sample by precipitating all dust and dirt. The cleaned sample travels at 50 ft./sec. in the sampling lines (quarter-inch copper tubing), so that initial response of the *entire* system is only about 10 seconds.

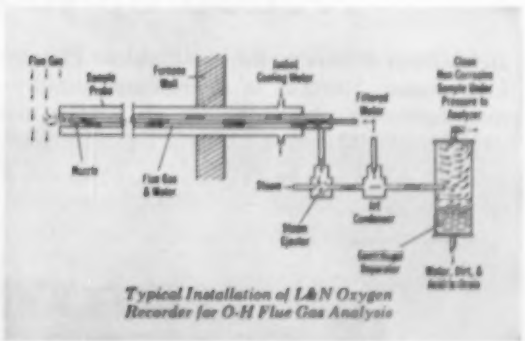
The Magnetic Oxygen Analyzer and the Speedomax G® recorder, calibrated directly in per cent O_2, may be located wherever convenient . . . are quickly checked against air to assure accurate performance.

Complete description of this equipment is contained in Process Data Sheet 643(5), available from your nearest L&N representative. Or write us at 4957 Stenton Avenue, Philadelphia 44, Pa.

LEEDS NORTHRUP
Instruments · Automatic Controls · Furnaces

In this O-H shop of Jones & Laughlin Steel Corp., Pittsburgh, the L&N O_2 Analyzer is used with a Speedomax G Controller, which adjusts a fuel-air controller (not shown) to provide automatic combustion control.

Schematic of Open-Hearth Flue-Gas Sampling for L&N Oxygen Analyzer



Typical Installation of L&N Oxygen Recorder for O-H Flue Gas Analysis

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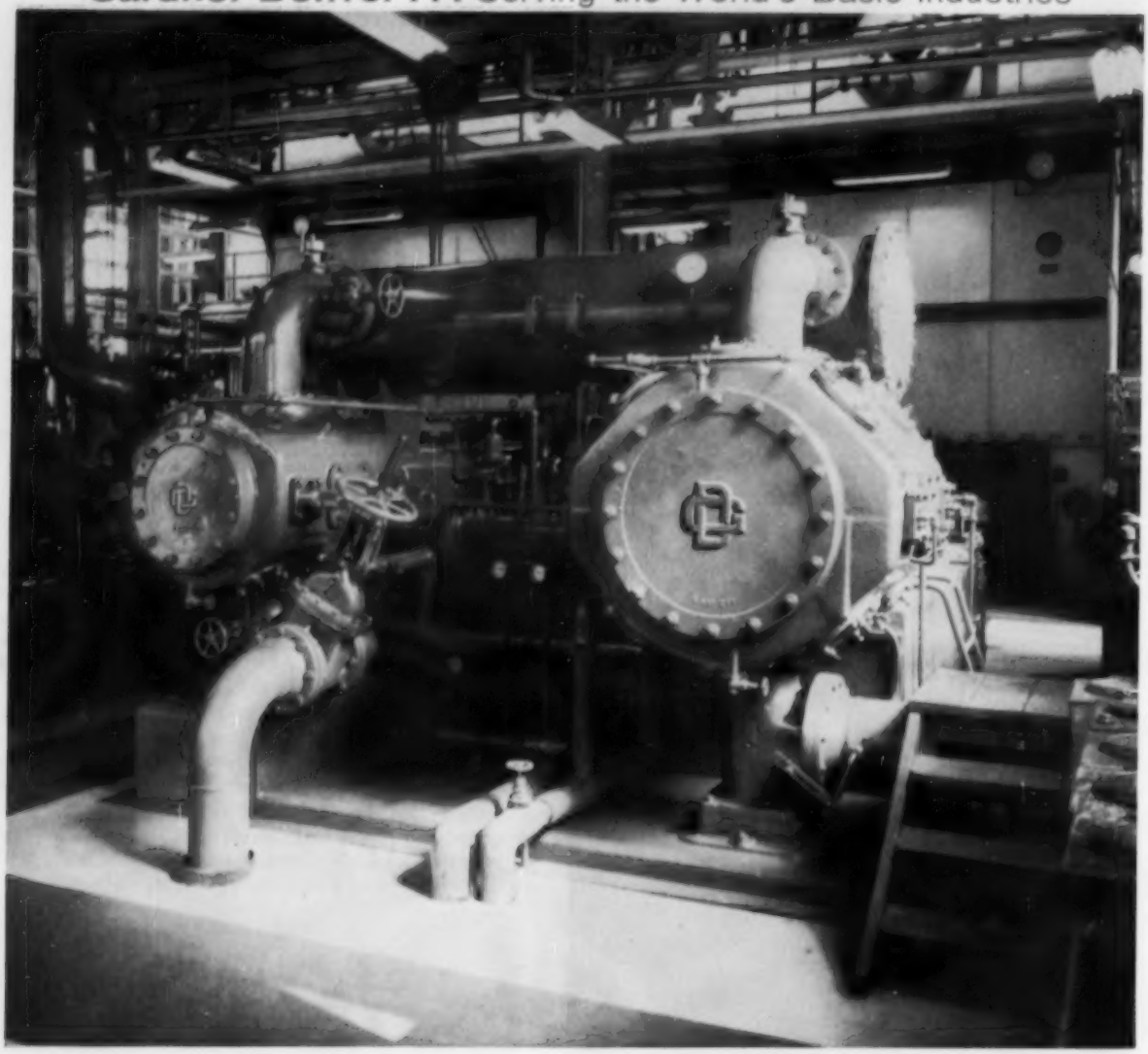

Model HA-530 to 2010 c.f.m. displacement.

Gardner-Denver Compressors . . . add up to a better investment

Investment dollars go far in a Gardner-Denver HA Compressor. Records of a southern foundry and manufacturing plant disclose an 8-year maintenance cost of $10.00—that's only $1.25 a year!

Add to this the fact that Gardner-Denver Compressors deliver plant air at unusually low cost figures—thanks to such outstanding features as correct air cylinder design and low-lift "air cushioned" valves. Yes, dollar-for-dollar you can't beat a Gardner-Denver Compressor.

JUST OFF THE PRESS: new Bulletin HAC-36 describing Gardner-Denver Horizontal Compressors. Your copy is ready, and will be mailed on request.

GARDNER - DENVER

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

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SIMPLEX low-carbon ferrochrome—chromium 63 to 66%, carbon max. 0.010% or 0.025%.

Low-carbon ferrochrome—chromium 67 to 71%, ten carbon grades from 0.02 to 2% max.

Medium-carbon ferrochrome—chromium 66 to 70%, carbon 2.25 to 3%.

High-carbon ferrochrome—chromium 65 to 70%, five carbon grades from 4.5 to 7%.

Low-chromium, high-carbon ferrochrome—chromium 57 to 64%, carbon 3.5 to 5%.

"EM" ferrochrome-silicon—chromium 39 to 41%, silicon 42 to 45%, carbon max. 0.05%.

for NITROGEN ADDITIONS

SIMPLEX nitrogen-bearing, low-carbon ferrochrome—in 2% and 5% nitrogen grades, containing 62 to 65% chromium and 60 to 63% chromium respectively.

Nitrogen-bearing, low-carbon ferrochrome—chromium 65 to 70%, in 0.75%, 1.25%, and 2% nitrogen grades.

Nitrogen-bearing, electrolytic manganese metal—containing approximately 93% manganese (metallic basis) and 6% nitrogen.

for MANGANESE

Electrolytic manganese metal—with minimum manganese content, on a metallic basis, of 99.9%.

Low-carbon ferromanganese—manganese 85% to 90%, six carbon grades from 0.07 to 0.50% max.

MANSILOY alloy—manganese 60 to 63%, silicon 28 to 31%, max. 0.07% carbon.

for additional information

Please contact the nearest ELECTROMET office. Ask for ELECTROMET's new 4-page brochure on electrolytic manganese and the booklets on melting low-carbon stainless steel.

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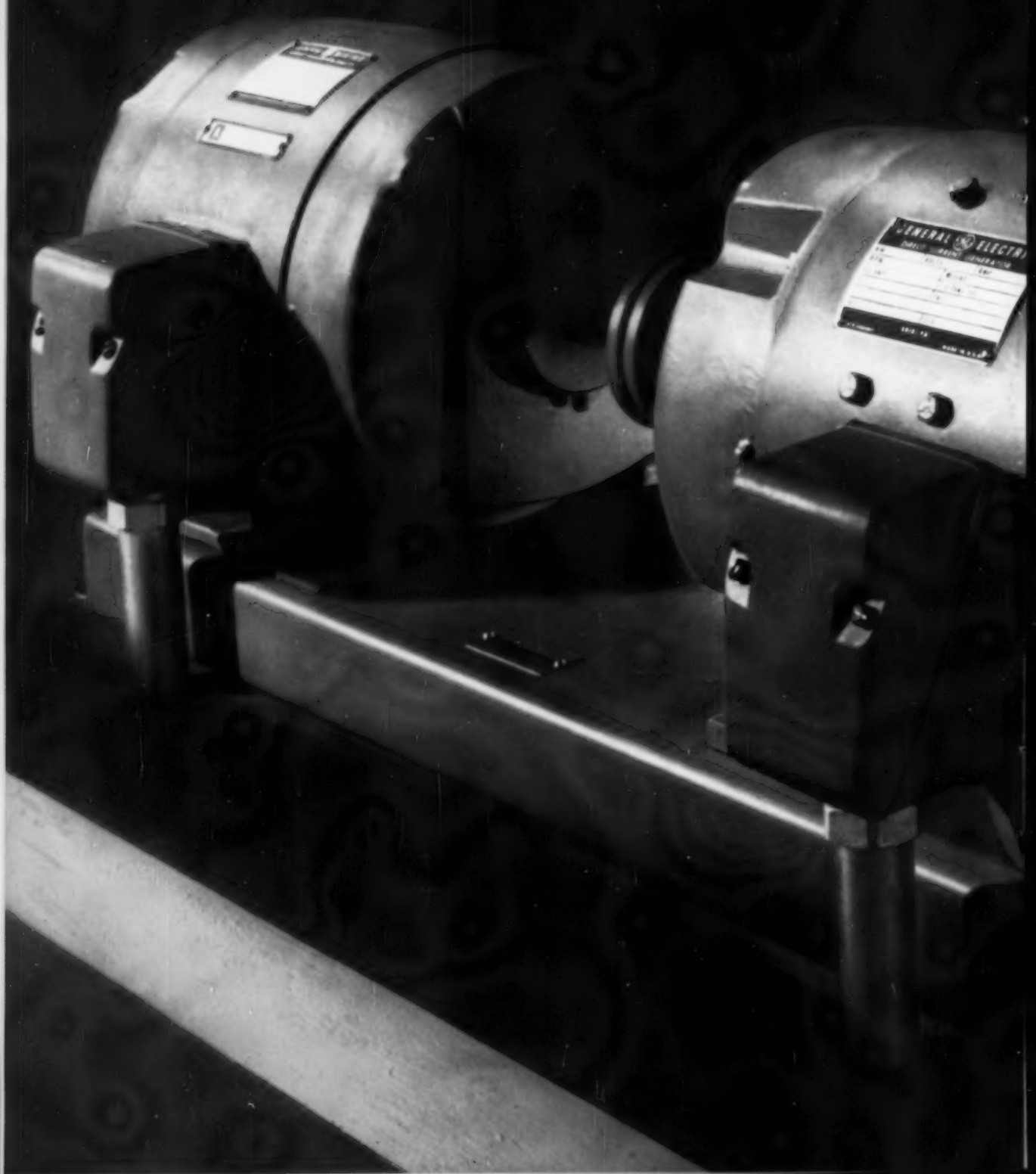
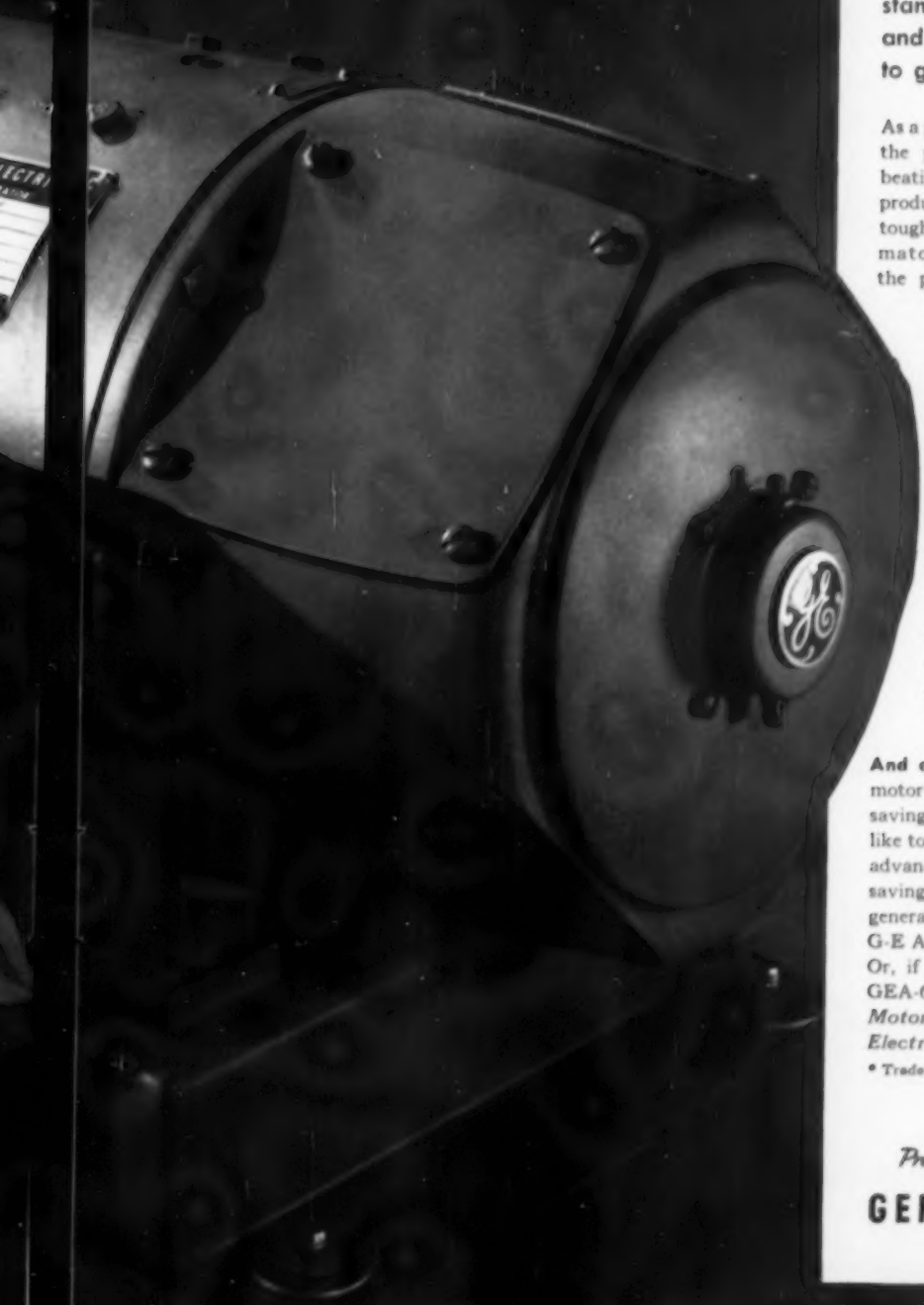
NEW General Electric



D-c Power Source



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As a progressive manufacturer, you are faced with the problem of boosting factory output and beating rising production costs. Where your production process involves adjustable speed, tough duty cycles, frequent reversals or speed matching, you may have already applied the performance advantages of d-c drives. To help you further boost production and reduce your automation costs, completely new sources of constant and adjustable-voltage d-c power are now available—General Electric d-c Kinamatic generators and m-g sets, ¾–100 KW.

More Power Per Dollar—D-c Kinamatic generators pack more power per frame size than any previously designed G-E generator. Nine new kilowatt ratings more closely match both the power requirements of your standard d-c drive motors and the power output of standard prime-moving a-c motors. This new matching gives you a more efficient, more compact adjustable-voltage drive at lower cost.

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Progress Is Our Most Important Product

GENERAL ELECTRIC

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Throughout his entire career, Floyd Dumas has practiced what he preached . . . *you can't have too much fire training.* So it was logical that this veteran of 29 years' experience should attend Ansul's Fire Training School. As Chief of Fire Prevention for Parke Davis & Co., one of the nation's leading manufacturers of pharmaceuticals, his responsibilities are tremendous. The information Floyd took home from the Ansul School was passed on to each member of his staff who will be better firefighters for it.

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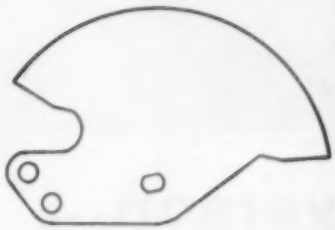
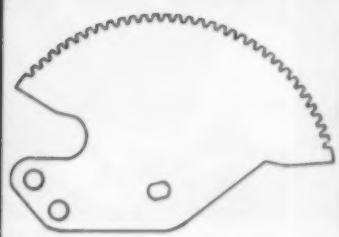
Involute teeth broached in 1200 pieces per hour

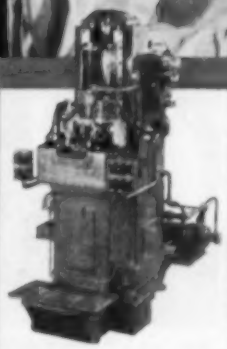
. . . 10 PARTS AT A TIME!

Part before broaching





With involute teeth broached



An indexing fixture, equipped with two loading stations and automatic clamping, is mounted on an American 3-way machine to perform this specialized high production broaching operation. While one station is broaching, the operator stacks 10 parts at the other station. The stack is automatically indexed into broaching position and then clamped. At end of the broaching stroke, the stack is indexed and discharged into a chute by an automatic air ejection unit.

The low piece cost obtained on this machine, is an example of the economies that American gives you — by supplying a machine completely tooled with work-holding fixtures and broaches.

Why not put American to work on *your* broaching problem. A parts print or sample will receive prompt attention. Or write for catalog 450. It is an informative manual on all phases of broaching.

American BROACH & MACHINE CO.

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See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery

NOTE ON PRIORITY RATINGS—When your stainless requirements are covered by a rating, please be sure to extend it on your order to Ryerson. You will be helping yourself by helping to assure future availability of nickel-bearing stainless from Ryerson stocks. Shown here: One Ryerson plant's stainless sheet section.

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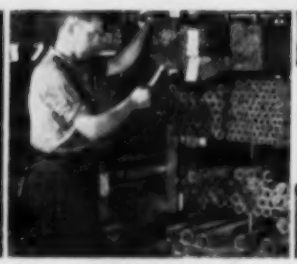
Ryerson stainless bar stocks include free-cutting types, aircraft quality bars—many others.

Any shape can be accurately flame cut from stainless plate with special Ryerson plate burning equipment.



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here's why: your call to Ryerson connects you with the nation's largest stocks of stainless steel—2,351 sizes, shapes, types and finishes of time-tested Allegheny stainless—carried in tonnages that assure prompt shipment of your warehouse requirements.

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STEEL
September 10, 1956

Metalworking Outlook

States Hunt More Business Income

The need for more revenue is driving state governments to a more concentrated search for a share of business income. Commerce Clearing House reports every state in the union taxes property, gasoline, motor vehicles, liquor, utilities and insurance companies and also charges business licensing fees. Some 35 have sales taxes, 34 levy franchise taxes, 32 tax corporate income, 31 have use taxes. Watch for more ingenious levies that will directly or indirectly demand a greater share of business income.

Auto Stocks Drop

The nation's 40,000 auto dealers will have average inventories of only about 12 cars each by next week end. Stocks of less than 500,000 will be far under the record total of more than 850,000 piled up in May and will be some 25 per cent under what they were a year ago. Stocks of unsold used cars will be down, too, at about 700,000, compared with 785,000 a year ago. Significance: The auto industry is ready for a flying start on 1957 model sales. Look for 1.8 million to be sold in the last quarter.

Partmakers Improve

Most auto part suppliers weathered the 1956 slip in auto production. *Value Line Investment Survey* points out they did it through diversification into nonautomotive lines. That diversification gives them greater stability, though they may not share fully in the sharp upturn expected for auto assemblers in 1957. The average estimate for next year's production is 7 million cars.

Backlogs Rise, Inventories Stable

You can expect order backlogs to rise moderately over the rest of the year. Inventories will remain fairly stable. The latest figures available, for the end of July, showed manufacturers' total backlogs at $60.5 billion, compared with $58.6 billion a month earlier and $50.8 billion a year earlier. Manufacturers' inventories on July 31 hit $49 billion, compared with $49.3 billion a month earlier and $43.9 billion a year earlier.

Coming: Freight Car Shortage

Brace yourself for a freight car shortage this fall when farm and industrial demands will combine to bring a severe pinch. Boxcars will be particularly scarce. The scarcity is worsened by the steel strike which prevented about 7500 new cars from being built because of lack of steel, notably plates. About 1,780,000 freight cars probably are rolling today, only 80,000 above the postwar low reached in 1955. Carbuilders have a backlog of about 116,000 cars on order, compared with 28,300 as of July 31, 1955. Until the steel walkout, production was averaging better than

Technical Outlook—p. 139 Market Outlook—p. 207

5000 units a month, but builders will have trouble hitting that level in the last four months of the year.

Trigger Tools Awarded

Trigger orders for 14,895 machine tools valued at about $220 million have been let to 70 builders. The orders will be inactive until the program is triggered by government notice to producers in the event of war mobilization. The Office of Defense Mobilization, which is running the program, will award contracts to another 14 builders.

Impact of Road Program

The federal road program will double the current use of galvanized corrugated metal culvert pipe. Wheeling Corrugating Co., Wheeling, W. Va., estimates that volume for all purposes will reach 550,000 tons annually by 1961. About 200 culvert fabricating shops operate in the U. S.

Railroad Vs. Seaway

Will all Labrador iron ore be moved into interior parts of the U. S. via the St. Lawrence Seaway? Not, if the New York Central Railroad has anything to do with it. It's moving a trainload of the ore a day—nearly 8000 tons—to Pittsburgh, Youngstown and other steelmaking areas. The railroad presumably is establishing an all-rail rate that will be competitive with vessel-rail costs to plants not directly on the Great Lakes. The New York Central reportedly plans to keep the rates competitive even when the seaway is completed.

West German Steel Gains

West Germany's ingot steel production hit 2,040,000 tons in August, the highest on record. For the first eight months of the year, production is running some 10 per cent higher than for the same period last year. Despite the gains, German steel users still can't get enough of the metal. The shortage in some products is worse than it is in the U. S.

Straws in the Wind

The steel industry has on file with the U. S. requests for fast amortization on projects to cost $781.2 million; the latest is a U. S. Steel application for a $94.4 million expansion of its Fairless Works . . . The iron and steel industry's payroll hit a record $1966.7 million for the first six months, estimates American Iron & Steel Institute . . . Kaiser Aluminum & Chemical Corp. has signed a three-year, no-strike agreement with the United Steelworkers . . . United Steelworkers has called a series of strikes to win the basic steel settlement from fabricators; bulk of the walkouts are in eastern Ohio and western Pennsylvania . . . Westinghouse Electric Corp. is introducing a metal-plastic refrigerator that features all-plastic bodies and steel doors . . . Orders for special tooling are being received by contract tool and die shops at a satisfactory rate in most centers, says National Tool & Die Manufacturers Association.

what's the DIFFERENCE...

the DIFFERENCE is...

To you, the user or buyer, the most important difference between MARVEL High-Speed-Edge Hack Saw Blades and ordinary blades is the *unequalled* performance you get from MARVEL Blades.

Performance reflected in higher production (faster cutting-off), greater accuracy of cut-off blanks, and longer blade life has made MARVEL the preferred blade in every kind of metal sawing operation.

To get the *difference* in performance, always insist on MARVEL High-Speed-Edge Hack Saw Blades. Leading Industrial Distributors have them in stock.

Write for "The MARVEL Story." It has complete details on MARVEL High-Speed-Edge Hack Saw Blades and Hole Saws.

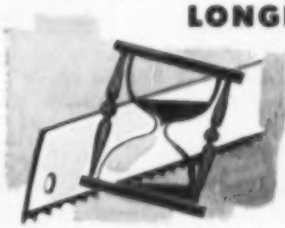
HIGHER PRODUCTION

Unbreakable MARVEL High-Speed-Edge Blades can be worked faster and harder than any other blade with complete safety. They will withstand the highest speeds and heaviest feeds attainable on any make hack sawing machine. MARVEL Blades will cut any machineable metal. No wasted time changing blades for different materials.

GREATER ACCURACY

Composite construction permits MARVEL Blades to be tensioned from 200% to 300% more taut than ordinary blades. This produces greater rigidity of the high-speed-steel cutting edge, resulting in maximum obtainable accuracy of cut-off blanks.

LONGER BLADE LIFE



Each MARVEL High-Speed-Edge Hack Saw Blade is triple tempered to assure maximum toughness of the cutting edge. MARVEL Blades not only give you longer life, they assure a more efficient cutting life, with resulting lower blade costs.

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Metal Cutting
MARVEL SAWS
Better Machines—Better Blades

On this heat-treating furnace at the Simonds Saw and Steel Co. plant in Fitchburg, Mass., door frames of gray iron buckled after three months. On the same furnace, ductile iron frames lasted a full year. Resisting oxidation and growth, and retaining good mechanical properties at elevated temperatures, ductile iron equipment outperforms by far that of gray cast iron. Ductile iron parts for Simonds were cast by Fitchburg Foundry, Inc., a subsidiary of Kingsbury Machine Tool Corp., Keene, N. H.

Ductile Iron outlasts gray iron 4 to 1 on furnace doors and frames

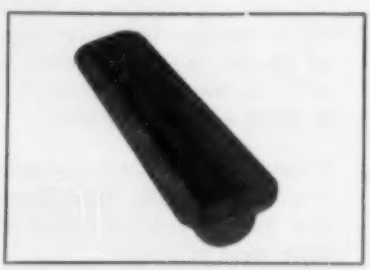
Furnace doors and frames of ductile cast iron help Simonds Saw and Steel Company cut heat-treating costs consistently. In three ways.

First, by *cutting the number of replacement parts needed* for their gas-fired heating furnaces that operate at 1800 to 2100°F. Previously, warpage shortened the life of brick-lined gray iron doors to eight weeks. Ductile iron doors now serve for 32 weeks.

Door frames made of ductile iron also give four times the life and need replacement only once a year.

Use of the ductile iron castings saves money in two other ways. It *saves costly brickwork*, and it *permits increased output* by reducing furnace downtime.

Ductile iron castings can help you where growth, scaling, cracking and distortion of parts needlessly increase your costs. For the facts about the combinations of properties offered by this material send for a copy of "DUCTILE IRON, The Cast Iron THAT CAN BE BENT!" It's full of helpful data. Write for your copy now.



Another way to cut costs. Simonds now uses ductile iron pots to hold molten lead at 1450°F. Where gray iron pots lasted three to four weeks, pots cast in ductile iron average 15 weeks of money-saving service. Ductile iron equipment in elevated temperature service often outlasts gray iron castings 10 to 1.

DUCTILE IRON

ductile iron . . . the cast iron that can be twisted and bent

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street, New York 5, N. Y.

Preview for '57

Business is becoming more complex every day. With so many changes coming along in manufacturing methods, products and marketing, a growing number of organizations are picking September as the time to preview what's ahead in the coming year. It's the month to set up sales goals, prepare budgets and do other planning.

An office machine manufacturer makes five separate forecasts: 1. General business. 2. Total orders for the industry. 3. Total orders for the company. 4. Orders broken down by types of machines. 5. Orders broken down by types of businesses sold to. After approval by sales, manufacturing and top management, the forecasts are used to determine production levels.

A builder of heavy equipment makes ten-year as well as short-term forecasts. Three basic factors are considered: 1. Population growth and the labor force. (Population will grow faster than the number of workers.) 2. Output per man-hour. (Future productivity will depend on investment in capital equipment per man.) 3. Number of hours worked. (The 40-hour work week will be reduced.)

As in the case of those companies, your planning needs to be tailored to your specific requirements. It also should be realized that their fortunes, as well as your organization's, pretty much follow the general trends in metalworking.

A large group of companies reporting to STEEL thinks sales will increase an average of 10 per cent in 1957, compared with 1956's. That would mean metalworking sales of $151 billion, up from $138 billion this year. Selling prices are expected to rise 4.25 per cent. Plant capacity will increase 16 per cent.

Here are some other forecasts for 1957: Steel production is expected to hit 125 million tons, vs. 114.5 million this year; auto output 7 million units, vs. 6 million this year; construction $48 billion, vs. $44 billion this year.

Aircraft sales ($5 billion in 1956) will show gains next year. Replacement of standard items like refrigerators will buoy an expanding market for appliances. Machine tool sales ($1 billion in 1956) will continue at a fast clip. Freight car production of 5000 units a month in 1956 will hold well into 1957. Farm equipment sales may be up slightly from $1.4 billion in 1956, but still under 1955 and 1954 marks.

This preview for 1957 is a strong reminder that 1956 is fast running out. Immediate action is needed to determine where your business is likely to be next year.

Irwin H. Such

EDITOR-IN-CHIEF

WHEN AUTOS CAME IN ONE COLOR

Hard to believe, isn't it, that the "last word" in the autos of our youth are now museum pieces. The automotive industry has drastically changed our mode of living and today is meeting the challenge of an apparently insatiable public demand for higher standards of design, power and comfort in personal transportation. Many of the advances in car design and performance have been made possible by improved steels. Working with automotive manufacturers to provide the *right* steels has been one of the important jobs at Inland for many years.

INLAND STEEL COMPANY *38 South Dearborn Street, Chicago 3, Illinois. Sales Offices: Chicago, Milwaukee, St. Paul, Davenport, St. Louis, Kansas City, Indianapolis, Detroit, New York. Steel products supplied to the automotive industry include hot and cold rolled sheets and strip, bars, plates, structurals, 4-Way safety plate. Other products: tin mill products, Ti-Co galvanized sheets, reinforcing bars, rails and track accessories, coal chemicals.*

Cleveland Area Settlements

(206 contracts negotiated since Jan. 1)

Increase in Cents	Number of Companies	Number of Employees
0.0	3	395
1 to 1.9	1	110
2 to 2.9	0	0
3 to 3.9	8	1203
4 to 4.9	3	6627
5 to 5.9	27	5695
6 to 6.9	43	49,426
7 to 7.9*	**28**	**7323**
8 to 8.9	15	6159
9 to 9.9‡	**13**	**22,564**
10 to 10.9	24	4680
11 to 11.9	3	2164
12 to 12.9	34	6791
13 to 13.9	0	0
14 to 14.9	0	0
15 to 15.9	1	975
16 to 16.9	2	742
17 to 17.9	0	0
18 to 18.9	0	0
19 to 19.9	0	0
20 to 20.9	1	165

Source: Associated Industries of Cleveland.
*Weighted average increase of all companies: 7.45 cents.
‡Average increase in the steel industry (Class B jobs) was 9.3 cents.

Labor Takes Aim

Nothing big is on the union docket for 1957, so watch for an attempt to close wage ranks in preparation for 1958. That may be Walter Reuther's year

ORGANIZED LABOR (for lack of bigger targets) may turn its guns on small and medium sized firms in 1957. The bull's-eye: The wage and benefit gap between multiplant companies and smaller outfits.

Next year's strategy is foreshadowed by the notice already served to metal fabricating firms that the unions expect wage settlements comparable to steel's package of 9.3 cents per hour.

The Quiet Year—Traditionally, the unions aim first at the larger companies for higher wages and more comprehensive fringe benefits. As those settlements filter down to smaller firms, labor again hits the larger for bigger concessions. A sort of double standard is maintained.

With no large scale negotiations scheduled for 1957, this filtering process will be speeded up. You can expect many skirmishes as the smaller companies try to avoid precedents set by the automotive, electrical and steel industries.

An independent steel container manufacturer states the case for the small firm: "Steel gave the union plenty for its three-year contract. We can't afford that sort of stability in our industry."

Individuality—Unions will recognize individual company problems (performance record, outlook, location and industry), but with steel scheduled for another 9-cent boost next year, the pressure on the small outfit will be heavy.

Besides demands for higher wages, shift premiums, insurance and pensions will get plenty of attention.

Adding up the score for 1956, Associated Industries of Cleveland says: "Many companies were willing to settle for a package including both wages and fringes in an effort to obtain a three or even two-year contract and achieve continuity of operation and predictable labor costs in this period of fierce competition." AIC notes, however, that what is good for one management is not necessarily good for another.

Some Pointers—If you are scheduled for negotiations next year, you might keep this in mind: Particularly in the case of smaller firms, a great deal depends upon the shop steward's report to the international business agent. When a company has no reason to publicize its profit and loss statements, the shop steward is many times the union's only source of information.

Notes one expert: "I've seen a shop steward who didn't know his company (but relied on his personal prejudices) throw a business agent completely off base." When you walk into a negotiating session, you will be wise to know your shop steward well enough to anticipate the direction his report will take to the international representative.

Background—The Cleveland area is regarded as a cross section of the nation because of such factors as population, retail sales and industrial makeup. It's an excellent sample of metalworking's commu-

1956 Wage Boosts by Company

Number of Employees	Companies Represented	Weighted Average Increase
1-49	29	$0.0674
50-99	32	0.0724
100-499	82	0.0760
500-999	7	0.0919
1000 or more	29	0.0728

Source: Associated Industries of Cleveland survey of 179 contracts negotiated since Jan. 1.

nity of small and medium sized plants.

The table on page 99 shows that the average wage increase granted by 206 companies since Jan. 1 in Cleveland is about 7.5 cents. Because that increase is about 2 cents below steel's package, you can expect the catching up process next year.

Multiyear contracts are the vogue in Cleveland, too. AIC found that 31 of the contracts were for three years, 103 for two years, one for 18 months and 71 for one year. Of the 134 multiyear contracts, 105 provided for deferred automatic increases.

Bureau of National Affairs Inc., Washington, found that about 28 per cent of labor agreements reached in the first half of 1956 provided for deferred increases. BNA reported that of 1880 wage settlements examined, over 50 per cent called for increases of 10 cents per hour or more. In the first half of 1955, only 30 per cent did so.

A recent survey by National Industrial Conference Board Inc., New York, found that 56 per cent of 923 labor-management agreements signed between June, 1955, and May, 1956, called for multiyear contracts. Bureau of Labor Statistics recently said that two-thirds of all major contracts run for two years or more.

The steel settlement, comments AIC, gave this trend tremendous impetus. Now the experts want to know how the trend will carry over into 1957's relatively quiet bargaining year.

Flexibility — As management trades higher benefits for the long term contract, some questions are already coming up about the stability of such contracts. A Michigan chemical company has voluntarily hiked its workers' wages above specifications in the agreement for deferred automatic increases.

You may see more of this, as management seeks to insure its chances for future long-term contracts. Whatever the cause, management is rapidly coming to the conclusion that any company's participation in the booming '50s depends on its labor stability.

Prelude—So 1957 looks like labor's year to consolidate before new wars break out on new fronts in 1958.

That will be Walter Reuther's year, the experts generally agree. The United Auto Workers' contract will be up for negotiation, and although there's nothing in the steel settlement to embarrass Mr. Reuther, you can count on him to try to keep the UAW as the pace-setter of the union movement.

Having watched steel follow the UAW lead on Supplementary Unemployment Benefits and the long term contract, Mr. Reuther will probably attempt to create new precedents by way of the 35-hour week.

His shots could be heard around the nation, too. Steadily increasing productivity via the automation route, plus a Republican administration's close rein on the boom might give Mr. Reuther all the ammunition he needs.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

Fleet Ends Strike

Ore shipments are resumed by U.S. Steel Corp.'s Pittsburgh Steamship Division

THE STRIKE is over; left behind are its problems. Most serious perhaps is U. S. Steel Corp.'s loss of over 3 million tons of iron ore shipments during a time when its mills were running full blast.

U. S. Steel does not believe that its production will be curtailed by depleted stocks; nevertheless, it plans to extend the shipping season of its 58 ships to mid-December and may use all-rail shipments to supplement its stocks.

The Settlement—Only three days of negotiations were needed for Pittsburgh Steamship to make an agreement with the Marine Engineers Beneficial Association and the Masters, Mates and Pilots Association after they had won bargaining elections.

Lee Pressman, general counsel of MEBA, puts the strikers' increase at 40 per cent, counting all benefits.

The three-year contract provides a pay increase of 5.5 per cent, time and one-half for all hours worked in excess of 8 hours a day and 40 hours a week, double time for holidays (starting July 1, 1958, double time and one-quarter), supplemental unemployment pay and other benefits.

A Precedent?—U. S. Steel does not consider the unionization of engineers and mates something that will lead to the organization of other supervisory employees. It sees the agreement as merely paralleling what has been the accepted situation on salt water. (Perhaps the coming of the St. Lawrence seaway was a factor in bringing the unions inland.)

Also, the company considered it noteworthy that the union backed down in its demand to have captain vote on representation.

However, the company's feeling on the whole matter may best be expressed by its statement after the bargaining elections: "The management of Pittsburgh Steamship is, of course, gratified that its chief cooks who participated in the elections have decided, by majority vote, to retain their status as members of management."

Logemann Brothers Co.

More Machines for Scrapmen

Capital investment requirements rise as the need for processing equipment mounts. Scrapyards seek to cut costs with bigger and better baling, material handling apparatus

IT TAKES more than a shoestring to get into the scrap business these days. Estimates of the minimum investment needed to set up an efficient operation range upward from $200,000.

That would cover a hydraulic baling press, a couple of mobile cranes with magnets, scales, torches, trucks, carriers and maintenance equipment. Some yards have investments running into the millions of dollars.

Mechanize—Much of the push behind this increasing mechanization has its counterpart in manufacturing—the desire to cut costs. In fact, some scrap firms are beginning to look on themselves as manufacturers turning out a vital industrial product, which calls for constant improvement in quality and ease of handling—and they are investing in machinery to do it.

"Larger and faster balers and hydraulic shears" are being used, says M. A. Schlafer, Schlafer Iron & Metal Co., Detroit.

Growth Ahead—The market for big balers will continue to grow, points out the Institute of Scrap Iron & Steel. Large balers can take two auto bodies or a bus or truck body and compress it to the size of a filing cabinet. Gains in the consumption of bundles account for the increasing investment in this type equipment. Look for bundle output to be stepped up even more.

Chances are that more mechanization is on the way. "The trends in scrap handling and processing equipment are toward bigger equipment, equipment capable of handling more material," states C. D. Axelrod, Moskowitz Bros., Cincinnati.

New Market—Henry Griesedieck Jr., vice president of American Pulverizer Co., St. Louis, points out that its 60-50 model crusher will reduce a carload (50 tons) of metal turnings in an hour. Not many years ago, there was next to no market for this size machine.

D. J. Cockrell, Magnetic Engineering & Mfg. Co., Clifton, N. J., says: "The magnet 40 in. in diameter and smaller used to account for 65 per cent of our magnet sales. Now, those sizes account for only 35 per cent. Sales of 65-in. lifting magnets are no longer a rarity, and we have a number of calls for 72 and 78-in. magnets."

Conveyors and other material handling equipment are getting a good play, too.

Prices Up — Equipment prices range about 20 to 35 per cent higher than they were five years ago. Opinion of machinery builders is divided about the likelihood of quotations going up because of steel price increases, but users are pretty sure hikes are ahead.

New Line? — Another "new equipment" item might be a disassembly line for scrapped autos. Some members of the industry feel there is a need for such lines. Investment would run $150,000 to $200,000, including the cost of an incinerator.

Another indication that this is a growing machinery market: In the opinion of people in the scrap industry and machinery sellers, most of the equipment being sold today is for additions to capacity rather than replacement. The replacement market is considered one where growth is still ahead.

Preparing Annual Reports For Employees

Don't confuse it with your annual report to stockholders. The employee report has a different function.

Give it the same care that you devote to your stockholder report.

Use simple language. Translate your stockholder report into easily understood words and pictures.

Don't glorify the company. Let the employee decide for himself.

If you have more than one plant, give an over-all report, plus a plant-by-plant breakdown.

Check your copy and other presentation techniques in advance with a cross section of your employees.

Know what your union is saying about the company in its publication. Your employee report may clarify special situations as they come up.

Tell Them the Score

Too many battles are lost because of poor communication lines between employer and employee. Here's another way to get your story over: The employee annual report

THE INFORMED employee is the best employee, says the U. S. Chamber of Commerce. Metalworking companies agree.

Pitney-Bowes Inc., Stamford, Conn., conducts annual jobholder meetings after employees have received copies of the stockholder report.

Aluminum Co. of America puts out a special employee annual report which simplifies and condenses the stockholder report. An enclosed reply card invites the employee's comments and suggestions.

Its Role—In conjunction with the company house organ, or separately, the employee annual report gives the worker a summary of the past year and calls the signals for the year to come.

Expansion goals and competitive factors are only two of the many business matters which employees want to know more about. Why did we buy that plant in Missouri last month? Will it mean less work for us in the home plant? What about plastics? Maybe metal is on its way out, and we should be looking for other jobs.

Profits—Don't be afraid, says the chamber, to talk about profits. The employee knows they exist (or should); trouble comes when he doesn't understand how they fit into the total business structure.

The same applies to costs. By breaking down your cost dollar for your employee, he will soon get the idea that lower costs can mean greater profits, hence better wages for him.

Techniques—Motorola Inc., Chicago, dramatizes its annual report with characters. Professor Sharin, Johnny and Mary Motorola have been used in cartoon sequences to guide the employee through the maze of the annual report.

The best annual reports are using the latest color and graphic techniques. They're as attractive as any newsstand magazine.

As for language, says the chamber: "It offers no basic course in American economics, but merely tells the facts of a company's year in such a way that the graduate engineer and the shop maintenance man learn the score."

Available—"Better Business Relations Through Employee Annual Reports" is available from the chamber's Business Relations Department, Washington 6, D. C., at 50 cents per copy.

National Carbon Expands More

Doubling its expansion plans announced last April, National Carbon Co., a division of Union Carbide & Carbon Corp., will increase its annual capacity to produce carbon and graphite electrode products by another 50 million lb.

Most of the 50 million lb expansion started in April has been completed. The additional program will call for new construction and the revamping of facilities.

Taylor Forge & Pipe Expands

Taylor Forge & Pipe Works of Canada Ltd., Hamilton, Ont., is extending its Beach road facilities to provide for expanding production.

Builds Bearing Plant on Coast

Industrial Tectonics Inc., Ann Arbor, Mich., is building a Western Division plant at Compton, Calif., to manufacture precision antifriction bearings. This plant will replace the Los Angeles plant that was acquired last October.

Integral Horsepower Motor Sales Rise

	Sales Billed (First Half) Units		Sales Billed (First Half) Dollars (millions)		Total Production (First Half) Units	
	1956	1955	1956	1955	1956	1955
Single phase						
1 hp and larger	99,683	90,534	$8.1	$7.1	96,980	84,695
Polyphase Induction						
1 through 5 hp	373,675	319,819	35.3	27.7	399,657	332,218
5 through 20 hp	91,193	82,105	23.5	18.8	111,098	90,150
20 up to 200 hp	42,935	37,700	38.0	29.4	52,403	41,608
DC Motors and Generators						
1 to 200 hp	28,713	29,368	20.2	17.2	32,769	34,987
Motor Generator Sets	9,911	8,176	14.6	10.5	15,086	11,373
Synchronous Motors						
1 to 200 hp	274	132	1.1	0.4	268	160

Source: National Electrical Manufacturers Association.

Integral Motor Sales Up

General Electric expects production of electric equipment to double over the next ten years. Direct current equipment, it predicts, will do substantially better

BOOMING business is commonplace among makers of integral motors. Several companies are setting sales records.

Louis Allis Co., Milwaukee, puts its 1956 sales at $40 million. That's $11 million over its previous high set last year. General Motors Corp.'s Delco Products Division, Dayton, O., says: "1956 will be our best year for integral motor sales, with an increase of about 80 per cent over last year's."

Source of Growth—J. B. Munson, Louis Allis' manager of distributor sales, states: "Automation definitely is increasing the market for direct current equipment and good alternating current adjustable speed equipment."

General Electric Co.'s Direct Current Motor & Generator Department expects an accelerated trend to direct current motors. Reasons: Growth of continuous processing and automation.

The market in automation is well illustrated by sales figures of Reliance Electric & Engineering Co., Cleveland. Its shipments in the first six months of fiscal 1956 (ended Apr. 30) were over $30 million, compared with $18.4 million in the similar period last year.

Crosscurrents — Automation creates a demand for more smaller motors. Countering this are the demands coming from the machine tool builders. They need bigger motors to supply the power needed for faster speeds and heavier cuts.

Another dual trend is noted by General Electric Co. It cites an effort toward standardization—toward making standard motors fit more applications—and the development of new motors for special uses. Electric Specialty Co., Stamford, Conn., says the market for special integral horsepower motors seems to be increasing.

Getting Smaller—The desire for compactness is increasing the demand for gear head motors and shell type or partial motors. Also new is the use of motors with low inertia rotating parts for the reversing and accelerated duty cycles dictated by automated processes. More high temperature motors are being made.

NEMA Standards—Louis Allis Co. estimates that about 80 per cent of the integral horsepower motors being sold are made in the new NEMA frame sizes. Better insulation, a major factor in making the smaller motors possible, is continuing to receive much attention.

Burroughs Digs In

Due to fast-growing demand for adding, accounting and computing equipment in Britain and the export market, Burroughs Corp., Detroit, will build additional manufacturing space in Scotland.

The first unit will occupy a 72-acre site at Cumbernauld, northeast of Glasgow. It will contain 200,000 sq ft of manufacturing space.

Burroughs operates other manufacturing plants in Great Britain at Nottingham, England, and Strathleven, Scotland.

Offices Use More Metal

More steel is going into metal office furniture. Reasons: Better designs, wider use of color and the continuing growth of business and industry. Makers map plant additions

THE CONTINUING expansion of business and industry is increasing the sales of metal office furniture. Not content with this increase, furniture makers are boosting their orders by developing efficiency promoting modular and functional designs and by using color generously.

There are over 100 makers of metal office furniture—vertical filing cabinets, horizontal and half sections and bookcases, high-line and bookshelf units, card index cases, transfer units, desks, tables, chairs, storage cabinets and wardrobes.

It's estimated that 12 to 15 major producers get 75 per cent of the business.

Sales Estimate—Metal office furniture sales in 1956 will be between $300 million and $325 million. Several companies have increased their sales over last year's by 12.5 to 35 per cent. Production has not increased as much; higher prices account for part of the increase in dollar volume.

The industry expects increased business over the next three to five years. Most manufacturers are preparing with plant expansion programs.

Business has been booming ever since 1950. Sales of metal office furniture normally lag about a year behind the building and construction industries but remain fairly stable in quiet times.

Among big users of metal furniture are governmental offices, insurance companies, industry, utilities, banks, etc. Often overlooked is the tremendous amount of paper work done at home by business people. This equipment need can be regarded as a source of sales that will continue over many years.

The Trend—There is a definite trend to metal. In 1947, the Bureau of Census put the value of metal furniture at $128.4 million, versus $48.5 million for wood—a ratio of 2.6 to 1 in favor of metal.

In 1953, the figures were $215.5 million for metal and $39.9 million for wood, a 5.4 to 1 ratio. But wood furniture is still popular in top level executive offices.

The trend is to steel as the office construction material. Some predict that combinations of plastics with steel pedestals eventually will supplant wood.

Use of aluminum, while extensive, is not increasing as fast as the use of steel. Aluminum is advantageous where lightness and mobility are essential. Its greatest use is in chairs. Lesser applications include hardware, such as handles, desk linoleum binding and card holders on files.

Something New—More modular, sectional and L and Z-shaped units have been featured in recent introductions of metal office furniture. They give the user greater convenience and offer more flexibility in arranging an office—important in enabling office machines to be positioned adjacent to desks.

Don't rule out future use of honeycomb structures (STEEL, June 11, p. 112). A company pioneering in the use of honeycombs for desk and table tops says its experience has been favorable, although production is still limited.

Eye appeal of contemporary lines and colors spur growth of metal furniture

Kaiser Places Rectifier Order

Kaiser Aluminum & Chemical Corp., Oakland, Calif., has ordered rectifier equipment valued at $4 million from Westinghouse Electric Corp., Pittsburgh. It will provide direct current electricity for two aluminum potlines at Kaiser's Ravenswood, W. Va., reduction plant. Plants in East Pittsburgh and Sharon, Pa., and Newark, N. J., will supply the equipment.

Plans $2-Million Plant

Utica Drop Forge & Tool Corp. will build a $2-million plant at Whitestown, near Utica, N. Y. It is scheduled to be completed early in 1957, says D. E. Waterbury, manager of the firm's Turbine Parts Division.

Opens Trailer Plant

Utility Trailer Mfg. Co. opened its new $1-million trailer manufacturing plant in La Puente, Calif.

More for Far West

U. S. Industries enters the jet field by buying Western Design. Other west coast news

U.S. Industries Inc., New York, is making its debut in the jet aircraft and missile fields. The firm has acquired all the assets of Western Design & Mfg. Corp., Goleta, Calif.

Full Circle—Commenting on the acquisition, USI's chairman and president, John I. Snyder Jr., said: "USI has taken another significant step in its diversification program, a step which will lead us into the fascinating era of supersonic flight, missiles and rockets. You might say USI has come full circle in its diversification program, from freight cars to jets."

Western Design will be operated as a USI division, and personnel will continue in their present positions. "Not a little of Western Design's skill and know-how reside in its highly trained personnel," noted Mr. Snyder.

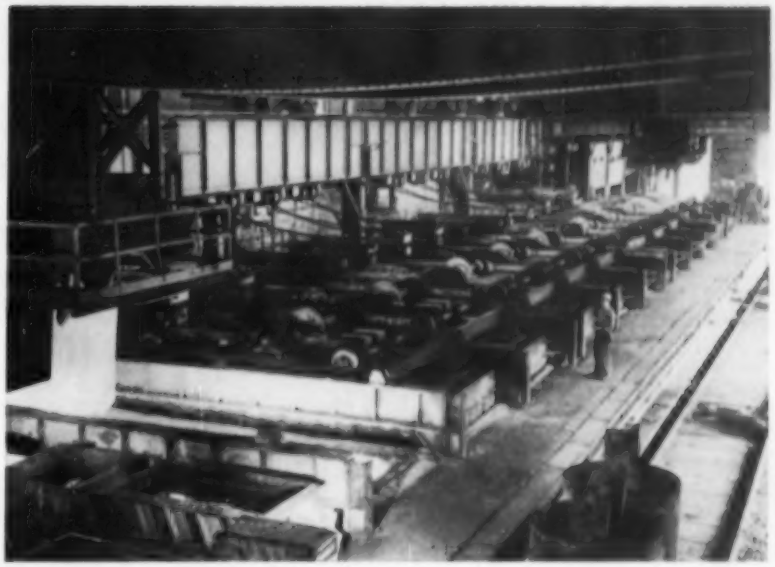
Background—The company has backlogs amounting to $5 million, and almost $4 million in pending orders is expected to be added to the backlog soon.

Founded in 1946, the firm makes electronic devices for jet flight control, rocket firing systems, etc. Counting heavily on its design and engineering skills, the firm considers few, if any, of its products as standard items. Constant modification of products goes on.

Ground Breaking — Other west coast expansion news comes from Daystrom Pacific Corp. A $1-million plant in Westchester (Los Angeles) will be occupied by February, 1957. Ground will be broken this month. The corporation and one of its west coast divisions, American Gyro, will employ 500 persons at the new office-research-manufacturing facilities.

Weston Electrical Instrument Corp., a subsidiary of Daystrom Inc., Elizabeth, N. J., Daystrom Pacific's parent firm, is opening a branch office and warehouse in Los Angeles.

Furnace Plant—Pacific Scientific Co. has completed a $500,000 furnace plant and regional headquarters in Los Angeles. The two units occupy 31,000 sq ft in the Gage Industrial Tract.



Homestead Adds Reheating Furnaces

Construction of four banks of modern reheating furnaces has been completed at U. S. Steel Corp.'s Homestead district works. A fifth bank at Homestead's 54-in. mill is under way, and five banks will be put in at the 44-in. mill

Westinghouse Expands Air Arm

Employment at Westinghouse Electric Corp.'s Air Arm Division plant, Baltimore, has jumped from 3200 to 4400 in the last six months. Plans to double that figure in the next two years make necessary the plant's third expansion program since 1951.

Euclid Buys in Hudson, O.

GM's Euclid Division has taken up options on 409 acres of industrially zoned land at Hudson, O., for future expansion.

The division, a producer of earth-moving and road-building equipment has no immediate plans for construction, but says a spokesman: Eventually "our major operations will be in Hudson, and we will have our division offices there."

AC Expects a Great Year

Expecting the 1957 model year to be "one of the greatest ever experienced in the automotive and part replacement industries," General Motors Corp.'s AC Spark Plug Division has revealed a multimillion dollar improvement program. Plans include: A 225,000-sq-ft manufacturing building near AC's main Flint, Mich., plant; enlargement of the instrument assembly area; an engineering test building; a new part handling system; new fuel pump machining and assembly facilities; a continuous operation for processing decorative die castings.

Canada Gets a New Pipe Plant

A group of Canadian businessmen has formed Prairie Pipe Mfg. Co. to build a $3-million steel pipe plant at Regina, Sask. Construction starts this month; initial production of 75,000 tons will begin in April, 1957. The western oil and gas industry will be Prairie Pipe's primary market for resistance welded pipe.

New Facilities for Avionics

Consolidated Avionics Corp., the aviation electronics subsidiary of Consolidated Diesel Electric Corp., Stamford, Conn., has acquired new office and plant facilities in Westbury, L. I., N. Y. About 5500 sq ft of space is available for production runs of Avionics products.

Tax Depreciation Rates May Get Needed Overhaul

LOOK FOR Internal Revenue Commissioner Russell C. Harrington to appoint a steering committee to revise and supplement Bulletin F. That's the controversial document which gives a schedule of useful lives upon which much of industry must base its tax depreciation rates. Bulletin F is substantially the same as it was when last overhauled in 1938. In the intervening 18 years, a revolution has occurred in equipment design and in the way machinery is used. Many experts believe the outmoded schedule is a major cause of industry's tax depreciation troubles today. But even if the steering committee is appointed tomorrow, months and months will elapse before revisions can be finalized.

Washington: Industrial Center?

Thinking of relocating a plant or establishing a new one? Take a look at the Washington area. Some 840 manufacturing establishments, employing more than 32,000, already have. The 1.9 million people in the Washington metropolitan area had incomes totaling $3.8 billion last year and bought goods worth $2.2 billion. Some 31,500 of these people are employed in research and development—10,000 by 75 private organizations.

Accent on African West Coast

Watch for more U. S. money to go into colonies and countries on Africa's west coast (such as the Gold Coast and Liberia) for the development of mineral resources. Manganese and other critical minerals could be brought to the U. S. without going through the Suez. Last year, for example, 1.7 million tons of manganese came through the canal from India, 833,000 tons of which were destined for the U. S.

Defense Tool Spending To Hit $90 Million

The Air Force and Navy will obligate some $90 million for machine tools in fiscal 1957, about the same as the total committed in fiscal 1956. And like last year, the services are slow to get the money spent. No fiscal 1957 funds are likely to be obligated until November, at the earliest. Some new tool orders have been placed since July 1, and will be let in September and October, but they will be paid for by funds left over from fiscal 1956.

BDSA Chief To Resign

Charles F. Honeywell, Business & Defense Services Administrator, will resign Oct. 15. His successor has not been picked.

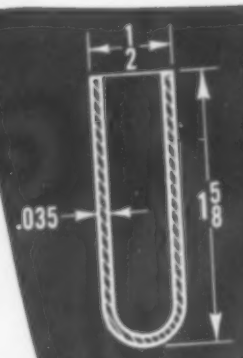
Operation Alert in Spring

Another Operation Alert is scheduled for sometime next spring. The last one, in the summer of 1955, indicated that much of America's industrial capacity could be knocked out by an all-out atomic attack. One objective of the new exercise will be to develop ways to minimize devastation.

Calling All Inventors

Uncle Sam needs inventive help. To learn some of the areas where assistance is required, write National Inventors Council, Department of Commerce, Washington 25, D. C., for a copy of "Technical Problems Affecting National Defense."

Meet Lewis P. Favorite: The new director of the Aluminum Magnesium Division of Business & Defense Services Administration will serve for about six months. He is on leave from his duties as manager of product sales for Aluminum Co. of America. In Washington, Mr. Favorite can be reached at STerling 3-9200, Ext. 4437, or in Room 4807, Commerce Building.



How to fully anneal this drawn copper shell . . . in large quantities . . . in short time . . . and get exact uniformity!

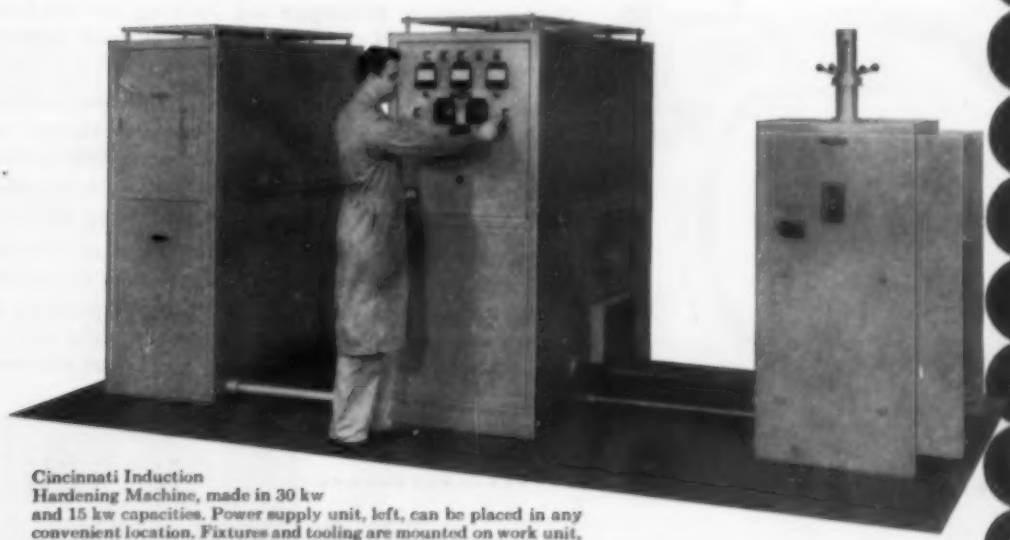
Cincinnati Inductron*

does it in 1.7 seconds per piece

Work hardening from the drawing operation interfered with subsequent operations, so these shells had to be fully annealed. Furnace heating in mass did not produce the high uniformity of anneal required, and the pace of production prohibited an increase in the heating time.

The problem was presented to Cincinnati heat treating specialists, and they devised a low-cost method of heating the parts, individually, in a new 15 kw *Cincinnati Induction Hardening Machine. A full anneal was produced at 1200°F. in 1.7 seconds. An automatic work handling system delivers the parts at the required rate.

If you have a selective surface hardening or part heating problem, talk to Cincinnati—*builders of both Flamatic flame hardening and induction hardening equipment.* Call in a Process Machinery Division field engineer. He is ideally equipped to evaluate your needs and give you unbiased recommendations as to the most economical and efficient method.

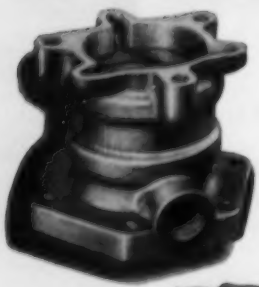


Cincinnati Induction Hardening Machine, made in 30 kw and 15 kw capacities. Power supply unit, left, can be placed in any convenient location. Fixtures and tooling are mounted on work unit, right. Bulletin M-1938 gives full details. Write for your copy.

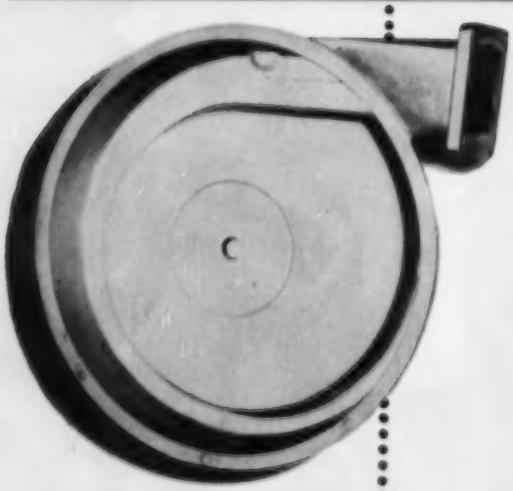
CINCINNATI **induction** *hardening*

PROCESS MACHINERY DIVISION
THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO, U. S. A.

DON'T OVERLOOK ALUMINUM PERMANENT MOLD FOR



MORE CASTING VALUE PER DOLLAR



New production techniques and finishing services have doubled the use of aluminum permanent mold castings during the past three years.

Monarch's continuous-melt furnaces and new finishes, such as Velvaglaze® and Spectraglaze, are examples of Monarch-pioneered methods for mass-producing quality aluminum permanent mold castings. These castings offer superior strength, metal structure and finishing qualities.

Monarch's progress has been accomplished in conjunction with the steady expansion of our proven die casting operations. Monarch's "non-competitive" experience in both casting methods will give you the right answer for mass-producing your product at the lowest end-cost.

SINCE 1913
MONARCH
ALUMINUM
PIONEERS IN CASTING PROGRESS

Velvaglaze, Spectraglaze and Monarcast are Trade Marks of

MONARCH ALUMINUM MFG. COMPANY—9205 DETROIT AVENUE—CLEVELAND 2, OHIO—OLympic 1-1700

MANUFACTURERS OF: *Aluminum Permanent Mold Castings • Zinc Die Castings • Aluminum Die Castings • Exclusive Velvaglaze Finishing • and Spectraglaze, colorful Porcelain Enamel on Aluminum Permanent Mold Castings.*

Metal Toy Price Ranges

Retail Price	Per cent of sales which are metal toys
25c or less	8
26c-50c	18
51c-$1	23
$1.01-$2	31
$2.01-$3	34
$3.01-$5	39
$5.01-$10	39
More than $10	68
All toys	30

Source: Toy Manufacturers of the U.S.A. Inc.

Charles William Doepke Mfg. Co.

Report on Toy Industry

It has growth potential (more kids equal more toys), but it is also a classic example of seasonal production. Some firms are diversifying in this direction

FIGURING THAT 4 million babies are born every year in this country, the metal toy industry looks like a good bet for the future.

Proof — Excluding bicycles, manufacturers' sales will hit $246 million this year, up 10 per cent from 1955's. Metal toy sales account for about 30 per cent of all toy sales (see table), while more metal goes into some plastic, rubber and wood toys.

About 228,000 tons of metal will be consumed by the industry in 1956—steel strip, light sheets, wire and tin mill products, some copper, aluminum and other metals.

Perspective—American Machine & Foundry Co. has purchased three companies in the field in the last five years (bicycles, tricycles and miniature autos). Other firms are also interested.

In considering the diversification possibilities of this business, here are some points to remember:

1. With 70 per cent of retail toy sales made in the six weeks prior to Christmas, seasonal production is the dominant factor of the industry. 2. It's tough to break into the staple toy items like bikes, autos and wagons. 3. Retail buyers aren't quick to buy new toy lines. 4. Buyers demand fast shipment on last minute re-orders.

European competition in metal toy lines is becoming increasingly keen.

Production Slumps—The industry is making some progress in its drive to eliminate the seasonal factor. Historically, toy production comes to a halt in October and isn't resumed until January.

Large retail chain organizations do their Christmas buying the previous January. Except for re-orders, the annual March toy fair winds up the buying season.

Toymakers are now campaigning for retailers to maintain their lines the year around. Several summer promotions have met with some success: This year, re-orders during the first seven months were up 10 to 15 per cent.

Special promotions for birthdays are helping, too. There are 65,000 youngsters under 12 who celebrate their birthdays on any given day.

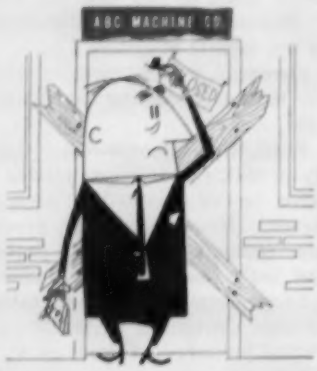
Staple Items—Manufacturers of bikes, autos and wagons aren't hit so hard by the seasonal slump. They sell from year to year with little model change, and are not at the mercy of public fancy.

But 80 per cent of the staple toy sales are made by a few large firms. A small firm trying to invade this line would find rough competition from about 20 other firms for the remaining 20 per cent of the market.

It's not all black, however. The postwar baby boom has filled the ranks of the 5 to 10 year olds, the largest toy consuming group. Prospects seem to be improving, too, on a geometrical basis.

Success Story—A few companies have entered the toy business because of seasonal slumps in their own lines. Revere Copper & Brass Inc., Rome (N.Y.) Division, maker of kitchen utensils, now produces a miniature line for children.

Says a Revere spokesman: "The line has been quite well received by toy buyers. The parent line of Revere ware has, of course, hastened its approval." Revere has been producing the miniature line for about a year. Regular Revere outlets handled the line at first; now more toy retailers are taking it on.



Record of Failures in Metalworking

	1950	1951	1952	1953	1954	1955	1956*
Mining	26	38	42	41	42	55	25
Iron & Steel & Products	71	40	50	66	115	120	73
Machinery	209	106	131	171	301	291	176
Transportation Equipment	62	18	44	60	51	47	32
Miscellaneous	376	269	251	291	348	390	219
Total	744	471	518	629	857	903	525

*First seven months only.
Source: Dun & Bradstreet Inc.

What To Do About Business Failures

ELECTION campaigning highlights the fact that business failures have risen since 1950. Metalworking is developing its own program to handle the situation.

There are two reasons why every company should do some serious thinking about Dun & Bradstreet's figures on failures:

1. The next failure could be a customer, a supplier, or a link in your sales chain.

2. Nobody blames himself when he fails. Since 1950, some 63,000 businesses have gone to the block. Counting only the owner of each and his immediate family, it means that more than 250,000 people have been converted from business enthusiasts to business knockers.

Action—Many first-ranking metalworking companies are on top of the problem. Republic Steel Corp., Cleveland, for example, has programs aimed at helping both customers and distributors.

When trouble signals start to show in a customer's payment record, Republic will help him pin down his problem to accounting, production, sales, or whatever other phase of his business is the root of the difficulty, then suggest ways to correct the situation. For its distributors, the corporation recently announced a course that is designed to help them sell pipe.

Enlightened — Boston Gear Works Inc., Boston, Mass., is another good example of a company that realizes it's smart business to help distributors. Its training program is a multilevel affair, involving correspondence courses, night class work in field offices and an intensive home plant course.

Auto companies do much the same thing. Chrysler Corp., Detroit, for example, has about 150 business management specialists working in the field with its distributor organization. Dealer meetings on subjects like accounting procedures and methods of absorbing overhead are held. Sales clinics are arranged. Individual business management analysis is also provided.

Causes—Lack of capital is the reason given for most business

Thirty Years of Business Failures

failures, but lack of managerial skills is almost always nearer the truth. The typical metalworking failure is ill-equipped. Say he was a first rate machine operator and is now struggling with a small machine shop. Say he was a salesman who established a distributorship or a manufacturers' agency and is now banking on his established following.

In either case, too often he lacks the varied talents essential to managerial success. Instead of being able to concentrate on his specialty (running a machine or selling a line of goods), his business demands other abilities, with planning and scheduling high on the list. He must be able to wear any one of management's five hats—finding markets, managing men, managing money, manufacturing methods and merchandising.

Perspective—The business failure problem isn't as troublesome as it's being painted in campaign speeches. Though failures are higher, business starts have more than kept pace. In 1953, there were 8862 failures, which were more than offset by 102,545 starts. In 1954, there were 11,086 failures and 117,164 starts. In 1955, there were 10,969 failures, 139,651 starts. Through June of this year, there have been 6496 failures, compared with 76,257 starts.

Totaled, that's a net gain of almost 400,000 businesses over the last three and a half years. It's axiomatic that if the number of businesses is increasing, the economy is healthy. It's also apparent that even today's higher failure rate is way down from that of the roaring twenties and the depressed thirties (see chart). Though the 1954 rate was the highest in 12 years, it's far below the average for this century—74 failures out of every 10,000 companies operating each year.

Summary—During any period of economic growth, more starts and more failures are inevitable. It's possible that most of the businesses that fail should never have been started at all. Dun & Bradstreet points out that most mortalities come in the first five years of an enterprise's life.

Today's rising figures can be partially explained by the fact that many failing companies were formed during lush Korean war subcontract days.

The other side of the coin: Costs are higher, competition is rougher.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Hupp Overseas

Stepping up international activities, Hupp buys company, establishes foreign division

RECENT announcements by Hupp Corp., Cleveland, signal that company's increasing interest in world trade.

1. Hupp International Division has been formed. It will be responsible for all activities outside continental USA.

2. Hupp has acquired a controlling interest in a Dutch manufacturing company, giving it its first European manufacturing facilities.

Personnel—Hupp International's prexy is Donald S. Smith. He will be assisted by three vice presidents: Roy Scantlebury, manager of export sales for the Typhoon Air Conditioning Division; Donald W. Milestone, export manager of the Perfection Industries Division; and A. R. Cline Jr., manager of international sales for the Gibson Refrigerator Division.

Mr. Scantlebury will establish and manage a New York office. Messrs. Smith, Milestone and Cline will be located at the Cleveland headquarters.

Expansion — Don H. Gearhart, president of the parent company, says of the Dutch move: "Management is hopeful that this is the initial step in a much-enlarged program for manufacturing a full line of Hupp products in Europe to serve markets also in Africa and the Near East."

Hupp will put new machinery into the plant, which presently has 60,000 sq ft of manufacturing space and employs about 185 people. If plans to manufacture heating and air conditioning equipment, home appliances, electronics and communications products, automotive and aviation components are realized, says Mr. Gearhart, further expansion will be undertaken.

Koppers in Italy

Koppers Co. Inc., Pittsburgh, has been awarded a contract to design and build a blast furnace for the ILVA subsidiary of Finsider, a financial group operating about 60 per cent of Italy's current steel production.

The furnace will go up at Bagnoli, near Naples. It's to be completed next year, and will have a hearth diameter of 25.5 ft. Its production is estimated at 1320 net tons of pig iron daily. In completing its present expansion plans, ILVA expects to install two more similar furnaces.

Jets in Japan

Consolidated Diesel Electric Corp., Stamford, Conn., has announced completion of an export agreement for sales in Japan with Daiichi Bussan Kaisha Ltd., Tokyo.

Covered is multipurpose ground support equipment for jet aircraft. Con Diesel is a large contractor for this type of equipment to the U. S. military forces.

Visiting Firemen

Jack Kleinoder, secretary-treasurer of Volkert Stampings Inc., Queens Village, Long Island, N. Y., is in Yugoslavia as a member of an official Commerce department mission to the Zagreb trade fair. . . Sher Muhammed Syed, deputy secretary of the Ministry of Industries of Pakistan, recently visited Joseph T. Ryerson & Son Inc. and Inland Steel Co., Chicago. Mr. Syed is studying the pricing structure of American industry to develop a sound procedure for removing government controls in Pakistan . . . S. K. Nanavati, a top executive of Tata Iron & Steel Co. Ltd., India, is on a three-month tour of steel works in Germany, the United Kingdom, the USA, Canada and Australia. He will arrive here in September and will visit Jones & Laughlin, United States Steel, Republic Steel and Kaiser Steel, among other companies.

How Great Lakes Steel *launches* quality

You're at 400 feet, banking for a good close look at the unloading operation of the *Ernest T. Weir*. She's packed to the gunwales, stem to stern, with ore—tons of iron-bearing food for Great Lakes hungry blast furnaces.

What's this got to do with turning out top-quality steel at Great Lakes? Plenty! For quality pig iron can only come from quality raw materials—like the *Weir's* rich cargo. And, of course, quality pig iron is the very backbone of top-quality steel.

Control of quality at Great Lakes begins right at the mines. In fact, each ore source is picked with painstaking care. Then, repeated checks in the mines—*double checks* here at the unloading docks—put the quality of Great Lakes raw materials beyond question!

It's that kind of control (from start to finish) that gives our flat-rolled products uniform quality—assures that they will reach our customers exactly when and as ordered. We're ready to talk your steel needs whenever you are.

GREAT LAKES STEEL CORPORATION

Detroit 29, Michigan • A Unit of

NATIONAL STEEL CORPORATION

District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

TO ASSURE TOP-QUALITY OPEN-HEARTH STEEL . . . iron ore (shown stockpiled here), coal and limestone—all of known source and quality—are sampled and tested over and over again by Great Lakes Steel raw material analysts.

Tow car pulls test car up to a tipover ramp at 45 mph

. . . the car is released and starts into its roll

The car lands on its right front quarter

. . . and follows a midair flipover with a long skid

These Chrysler rollover tests check door latches as . . .

Autos Get Safety Probe

A TEAM of congressional investigators probing into automobile and highway safety have found Detroit carbuilders ready and eager to show them the industry is and always has been safety conscious.

At the end of a week (Aug. 27-31) of speeches, statistics and proving ground tests, the outlook shapes up like this: For auto makers, continued emphasis on safety in 1957 and much less bragging about horsepower.

The Congressmen indicate they eventually hope to co-ordinate activities of groups working on many aspects of traffic safety, to push for federal or state aid in driver training education. They left Detroit with a better understanding of design and engineering problems the industry faces in building safer cars.

Aim — Although subcommittee chairman, Kenneth A. Roberts (D., Ala.), made it clear the Congressmen were only after information, many of the lawmakers' questions jabbed deep into vulnerable chinks in the industry's armor. The sleuths jumped on advertised horsepower claims, windshield optics and whether costs were a deciding factor in making safety devices optional rather than standard equipment.

Comments ranged from the advisability of taxing autos on horsepower rather than weight to the revelation that Chrysler is making center-plane brakes available (but not standard) on all 1957 cars. The company even explained that Dodge and Plymouth tailfins were safer because they offer aerodynamic stability against side winds.

Lineup—The Congressmen visited General Motors, Ford and Chrysler. Previously, they talked with American Motors Corp. personnel in Kenosha, Wis. Studebaker-Packard Corp. is expected to get the works later.

Subcommittee members are: Chairman Roberts, Representatives John V. Beamer (R., Ind.); Samuel N. Friedel (D., Md.); Walter E. Rogers (D., Tex.); and Paul F. Schenck (R., O.). These excerpts from the hearings pinpoint areas of interest.

Hold the Horses—In seeking reasons for increasing horsepower,

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Mr. Roberts discovered apparent discrepancies between advertised and actual horsepower ratings. He asked: "Do you mean to tell me that when I pay for 200 hp I'm only getting 120?"

Replied GM's Charles A. Chayne, vice president of engineering: "Yes, and another fellow with air conditioning might be getting even less. That's why we have to use maximum rated horsepower as a standard; the aim of the industry has been to improve performance in the city and suburban driving ranges. The rise in top speeds has just been incidental."

No Contest—Later in the week, Chrysler engineers displayed charts to prove increased horsepower makes for safer maneuverability at normal speeds. Inquired Mr. Roberts: "Did the so-called horsepower race come from competition or from engineering surveys?"

Roy C. Haeusler, Chrysler's automotive safety engineer, answered: "That's rather difficult for me to determine (as an engineer)."

Mr. Roberts: "Well, didn't the major segment of the industry step up horsepower about the same time?"

Mr. Haeusler: "Yes, I think so." The subcommittee chairman didn't press his point.

Eye Strain—Commenting on recent criticisms by optometrists that wrap-around windshields primarily are designed for styling values, Congressman Schenk asked: "Do wrap-around windshields have any distortion?"

Paul C. Ackerman, Chrysler vice president and director of engineering explained: "It's true we have some distortion in far corners. But the old model windshields (slanted from a center post) produced eye strain where the driver had to look most of the time."

Improvement—Alan G. Loofbourrow, Chrysler's executive engineer for chassis, electrical and truck engineering, pointed out that between 1946 and this year, angular visibility had increased from 264 to 304 degrees. "In our 1957 cars, total visual area is increased by as much as 38 per cent," he added.

Queried Mr. Roberts: "Can you give me the name of some optical experts you have consulted?"

Mr. Haeusler: "No, I cannot."

Mr. Roberts: "Wouldn't you think optical people would be good people to consult?" Mr. Haeusler indicated it might well be.

Mr. Ackerman: "We talked with Pittsburgh Plate Glass even before we went to wrap-around windshields."

Cost Conscious — Congressman Friedel charged auto makers have been lax in not making proved safety devices standard equipment on all cars. He wanted to know if price was a consideration.

Mr. Chayne, GM, replied: "Such extras are competitive price factors which affect sales." He added that customers wouldn't buy some extras even though they did add to vehicle safety. He cited rear windshield wipers as an example although it has been rumored that one GM line will make them optional equipment in 1957.

Blinker—Mr. Friedel pursued the same tactics at Chrysler. He said windshield wipers, a known safety device, are standard. He thought directional signals also should be a standard item.

Harry E. Chesebrough, executive engineer, product planning, retorted that engineers still consider automatic turn signals a supplemental device. Mr. Loofbourrow added that only about 2 per cent of this year's Plymouths didn't have the signals. Conversation following the hearings indicates turn indicators likely will become standard items on all cars by 1958.

Belted—Safety belts got a good going over at Ford Motor Co. Ford started its 1956 advertising campaign on a safety kick with seat belts as a prime talking point. Although company officials told the subcommittee the campaign had been successful, by midyear sales had slipped so far behind, Ford dropped safety and began plugging performance and price as its competitors were doing.

Robert S. McNamara, vice president and general manager of Ford Division, stated that auto fatalities could be cut in half if all cars were equipped with safety belts and proper interior padding. He said such devices would cut the 38,000 annual traffic deaths to 19,000 and reduce injuries from 1.2 million to 500,000.

Mutuality — Congressmen indicate they are pleased with the information obtained from the week long confab. Detroit observers get the impression the industry itself is surprised as how much it is doing to aid in vehicle safety. They admit there's plenty of room for improvement.

U. S. Auto Output

Passenger Only	1956	1955
January	612,079	659,508
February	555,596	675,495
March	575,234	794,015
April	547,766	753,851
May	471,533	724,892
June	430,279	649,393
July	448,804†	659,763
7 Mo. Total	3,641,291†	4,916,917
August		614,493
September		461,591
October		517,813
November		749,061
December		682,257
Total		7,942,132

Week Ended	1956	1955
Aug. 4	111,152	140,788
Aug. 11	108,155	149,199
Aug. 18	98,348	138,209
Aug. 25	69,977	129,591
Sept. 1	57,478†	85,851
Sept. 8	50,000*	79,366

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Buick Speeds Handling

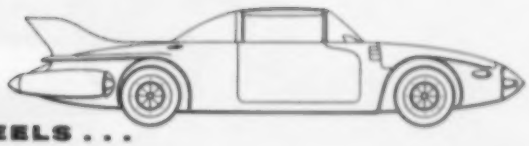
A streamlined material handling system is in operation at GM's Buick Motor Division, Flint, Mich. Edward T. Ragsdale, general manager, reports the system, which he calls palletization, has greatly increased efficiency and cut handling costs.

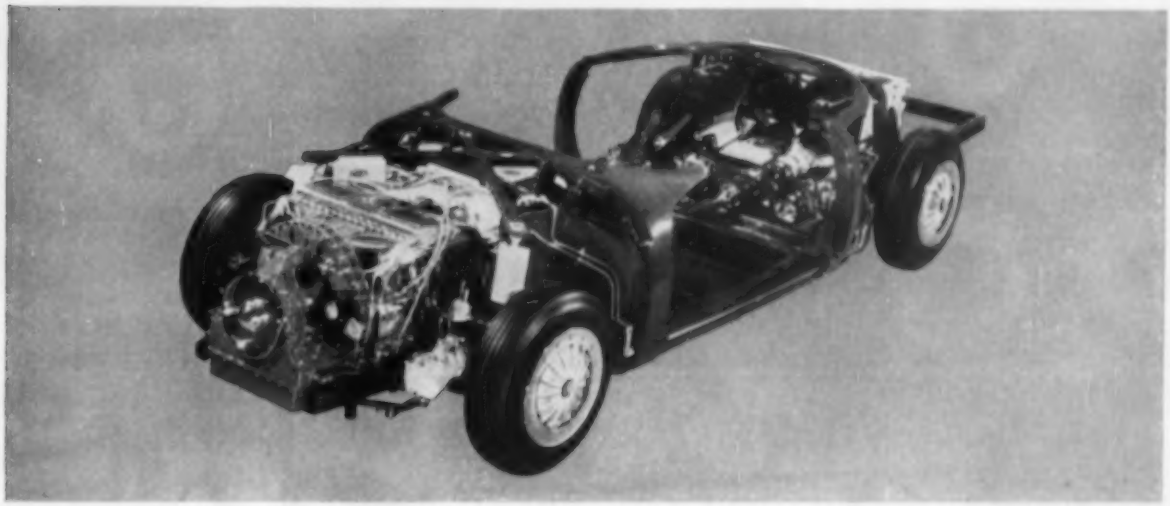
Incoming parts arrive on pallets so they can be picked up with fork lift trucks rather than by hand. Packaging is an important part of the palletization process.

Where ten steering wheels used to come in one cardboard carton with a stapled cover, 156 now arrive in four open-faced boxes with a single lid which lifts off easily.

Radios used to be shipped two to a box so they could be hand carried. Now they're packed 80 to a carton, all under one top. Wooden kegs, formerly used for nuts and bolts, have been scrapped in favor of multiple cardboard cartons.

FROM 35000 RPM AT THE TURBINE
TO 2400 RPM AT THE WHEELS . . .





HYATTS SMOOTH THE FLOW OF POWER IN GM'S EXPERIMENTAL FIREBIRD II

Taming the terrific torque of this gas turbine developed by the GM Research staff is no job for ordinary bearings. Only the *finest* straight cylindrical roller bearings can stand the gaff!

HYATTS easily handle the whirlwind speeds generated, and at the same time let the turbine shafts float horizontally when they heat up. This "free lateral" feature automatically compensates for shaft expansion *without changing the bearing centers.* In the reduction gear train, too, HYATTS pass along the power with minimum frictional losses and maximum resistance to the punishing stress and strain.

So if you've got a tough gas turbine bearing problem, come to HYATT for help. Remember . . .

HYATT has more experience with gas turbine applications of roller bearings than anyone else in the field—why not profit by it?

HYATT ROLLER BEARINGS

STRAIGHT ◯ BARREL ◯ TAPER ◯

HYATT BEARINGS DIVISION • GENERAL MOTORS CORPORATION • HARRISON, NEW JERSEY

"A wing and a prayer" ...and plenty of nuts and bolts!

ABOUT A THOUSAND assorted nuts and bolts keep this airborne performer in one piece despite the beating it takes show after show.

Obviously, the fasteners that keep the parts together have to be strong and flawless to stand up under the terrific stresses.

They do a big job, these standard fasteners. Take the automotive industry alone – over *10 billion* fasteners used last year!

RB&W—A MAJOR SUPPLIER TO INDUSTRY

A leader in the field for over 111 years, RB&W turns out the finest fasteners possible to meet the insatiable needs of automotive and other major industries.

Modern facilities, new techniques, long experience . . . all combine to make RB&W fasteners truly the "strong point of any assembly."

SEND FOR THE RB&W "FASTENER MAN"

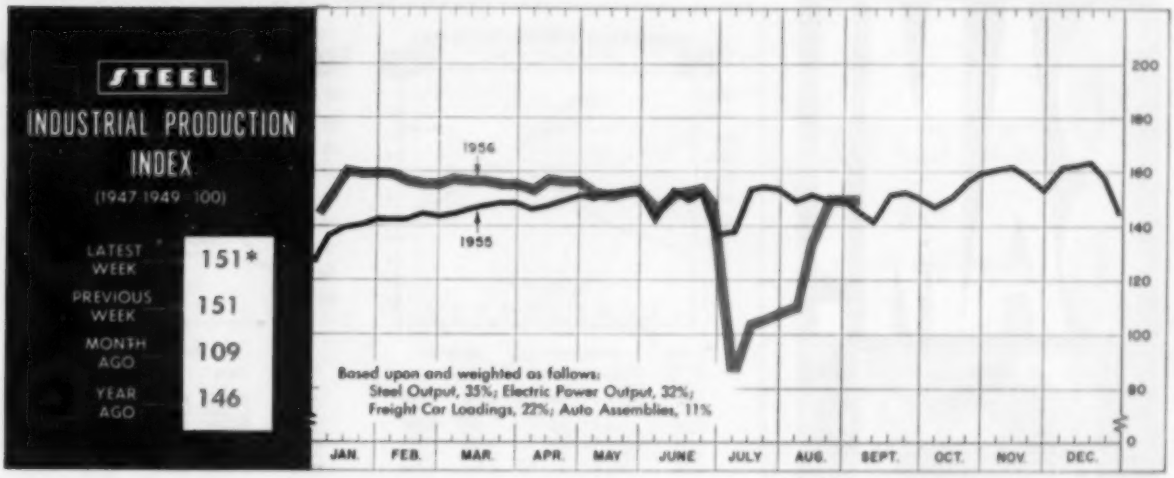
If the product you make is assembled with fasteners, chances are the RB&W "Fastener Man" can find a way to save you money. He can recommend and supply the right standard fastener for just about every job. Contact your nearest RB&W office.

RB&W
111th year

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Plants at: Port Chester, N. Y., Coraopolis, Pa.; Rock Falls, Ill., Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver. **Distributors from coast to coast.**

RB&W FASTENERS - *Strong Point of any assembly*



*Week ended Sept. 1

Poststrike Recovery Nearly Complete

IN LITTLE OVER a month, the nation's economy has virtually recovered from one of the costliest steel strikes in history, proving that the dynamic force of the 1955-1956 boom is not about to be stopped.

Reports from every sector of the country indicate that industry is still in high gear and working out any shortage problems without seriously disrupting production. Little production outside the steel industry was lost during July and August. Merchants report that even though about $300 million was lost in wages during the strike, consumers continue to spend at a record pace. For the week ended Aug. 25, department store sales leaped 8 per cent ahead of those in the corresponding week last year. For the year to date, sales are ahead of the year-ago period by 4 per cent.

Index Revives — STEEL's industrial production index indicates how sharp the recovery has been. During the two latest weeks, the trend line has leveled off at 151 per cent of the 1947-1949 average. This compares with 148 during the last week in June when the mills began strike preparations. The second quarter average was about 153.

The only element of the index which is not up to or near the prestrike level is automotive. But with steel operations approaching 100 per cent of capacity, electric power output surpassing the 11 billion kw-hr mark for the sixth consecutive week, and freight car loadings still climbing, the gains have more than offset the declines. The present level will hold through most of September. As automotive production hits its stride in October, the trend line will climb toward the all-time record of 163 which was set last December.

Rebound—Further evidence of this strong recovery is found in one of the cities hardest hit by the strike—Pittsburgh. The Bureau of Business Research at the University of Pittsburgh reports that by

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,429[1]	2,389	2,264
Electric Power Distributed (million kw-hr)	11,500[1]	11,340	10,706
Bituminous Coal Output (1000 tons)	9,945[1]	9,960	9,650
Petroleum Production (daily avg—1000 bbl)	7,127	7,122	6,684
Construction Volume (*ENR*—millions)	$616.6	$321.5	$330.3
Auto, Truck Output, U. S., Canada (*Ward's*)	76,922[1]	89,086	105,680
TRADE			
Freight Car Loadings (1000 cars)	772[1]	770	794
Business Failures (Dun & Bradstreet)	215	180	184
Currency in Circulation (millions)[3]	$30,618	$30,654	$30,268
Dept. Store Sales (changes from year ago)[3]	+8%	+5%	+9%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,246	$22,056	$18,031
Federal Gross Debt (billions)	$275.4	$274.9	$278.2
Bond Volume, NYSE (millions)	$15.0	$18.1	$22.2
Stocks Sales, NYSE (thousands of shares)	8,032	8,893	9,062
Loans and Investments (billions)[4]	$85.9	$86.1	$84.1
U. S. Govt. Obligations Held (billions)[4]	$26.9	$27.2	$31.0
PRICES			
STEEL's Finished Steel Price Index[5]	225.71	225.71	207.63
STEEL's Nonferrous Metal Price Index[6]	262.5	262.3	260.0
All Commodities[7]	114.6	114.6	109.9
Commodities Other Than Farm & Foods[7]	122.3	122.3	114.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

BAM!

and there's your ring in just 1 STROKE!

This basic ring — with the flange outside and close tolerance inside — had to be made in tremendous quantities for military use.

It could have been "hogged" or machined out of a bar, tube or forging . . . at great expense. But we at Presteel knew it could be stamped.

Our process called for blanking and drawing,* redrawing, piercing the bottom and final forming; the latter in our 1500-ton press.

BAM! in just one stroke, the blank sleeve became the finished ring — untouched by a machine tool!

What happened to costs is obvious. Close tolerances were held; there were no locked-in stresses. Maybe we can apply this principle to a part you use.

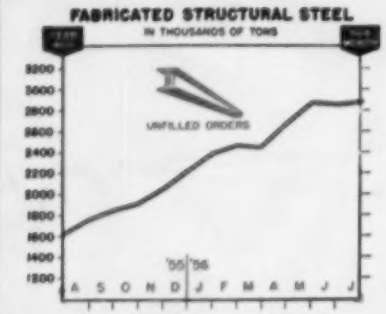
Let us solve your toughest pressing problem — with a saving!

Get a quote from the leader — PRESTEEL!

WORCESTER PRESSED STEEL COMPANY

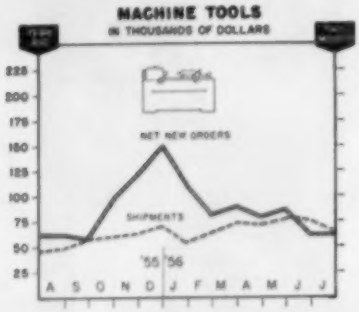
707 Barber Ave., Worcester 6, Mass.
Please ask your representative to call ☐
Please send newest brochure ☐
Name _____
Title _____ Company _____
Street _____
City _____ Zone _____ State _____

THE BUSINESS TREND



	Shipments		Backlogs	
	1956	1955	1956	1955
Jan.	251.5	225.8	2,408	1,346
Feb.	285.4	213.4	2,476	1,360
Mar.	306.8	227.8	2,463	1,392
Apr.	289.6	239.7	2,687	1,444
May	306.2	223.2	2,896	1,592
June	284.7	282.3	2,859	1,706
July	165.5	219.4	2,904	1,639
Aug.	.....	268.0	.....	1,776
Sept.	.....	289.1	.....	1,854
Oct.	.....	283.8	.....	1,928
Nov.	.....	258.9	.....	2,075
Dec.	.....	248.0	.....	2,243
Total	.....	2,979.4		

American Institute of Steel Construction. Charts copyrighted, 1956, STEEL.



	New Orders		Shipments	
	1956	1955	1956	1955
Jan.	109,550	57,650	54,600	49,500
Feb.	81,300	58,000	64,600	49,750
Mar.	89,500	80,650	74,150	59,900
Apr.	79,300	50,250	71,800	53,250
May	87,100	68,700	76,800	53,500
June	61,850	74,550	76,250	58,800
July	62,100*	62,200	65,350*	45,200
Aug.	.....	62,050	.....	48,650
Sept.	.....	58,350	.....	57,300
Oct.	.....	99,150	.....	60,400
Nov.	.....	124,250	.....	63,350
Dec.	.....	151,300	.....	70,300
Totals	.....	927,100	.....	670,400

*Preliminary.
National Machine Tool Builders' Assn.

Aug. 25, total business was above the level during the last prestrike week in June. It took only three weeks for the bureau's index to shoot from 95.3 (1935-1939 = 100) at the beginning of August to 198.2. This is about 5 percentage points better than the figure a year ago when there was no major strike.

Construction Snaps Back

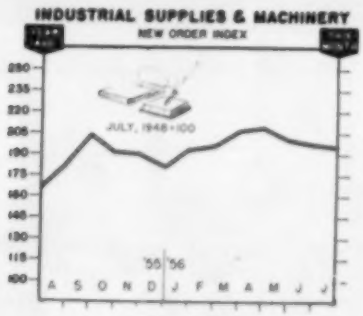
After taking a breathing spell for about six weeks, awards for heavy construction came back with a vengeance in the week ended Aug. 30, posting the third highest weekly figure for 1956, reports *Engineering News-Record*. Private construction was the backbone of the $616.6 million total, with mass housing ($263.8 million) scoring the highest figure since June. Industrial buildings accounted for $154.9 million of the total. The year to date is still 19 per cent ahead of the corresponding period of 1955.

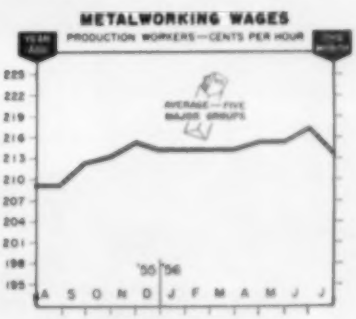
The fast pace of heavy construction and the steel strike combined to raise the backlog of fabricated structural steel to a new peak in July (2,903,725 tons), according to the American Institute of Steel Construction (see chart above). Bookings were down to 288,166 tons in July, the first time they have dipped below the 300,000 ton mark since April, 1955. Officials in industry do not see a trend in this dip, attributing it mostly to caution that accompanied the steel strike. They expect a rebound in August.

Shipments were cut to nearly half of first half levels by the strike. They will show some improvement in August, reflecting the end of the mill shutdown, but producers and fabricators do not expect prestrike levels to be regained until October at least. While this condition may put additional pressure on backlogs, the institute does not expect the peak to go much higher. Some improvement in supply should be noticeable in November and December as announced expansion programs start to pay off. Work on hand and anticipated will keep the industry at full tilt well into 1957.

Gear Sales Set Record

The gear sales index of the American Gear Manufacturers Association jumped 16.8 per cent in July, the largest percentage gain





	1956	1955	1954
Jan.	192.7	164.4	139.8
Feb.	195.9	175.1	140.5
Mar.	206.7	186.9	141.5
Apr.	208.6	173.7	131.9
May	200.6	191.6	129.4
June	197.8	189.1	136.4
July	195.6	163.7	119.4
Aug.	....	181.2	132.5
Sept.	....	203.2	148.1
Oct.	....	190.0	136.3
Nov.	....	189.7	146.2
Dec.	....	180.0	148.8

Amer. Supply & Machinery Mfrs.' Assn.

1955	Prim. Mtls.	Fab. Prod.	Machinery	Elec. Mchy.	Trans. Equip.
July	229	199	208	188	223
Aug.	227	198	209	188	224
Sept.	234	201	211	189	226
Oct.	231	203	213	191	227
Nov.	231	203	215	191	231
Dec.	232	203	216	192	228
1956					
Jan.	233	203	217	193	225
Feb.	232	202	217	193	224
Mar.	232	203	217	194	225
Apr.	233	204	218	196	226
May	233	204	218	196	226
June	234	206	219	197	228
July*	n.a.	205	220	198	229

*Preliminary. n.a.—Not available because of steel strike.
U. S. Bureau of Labor Statistics.

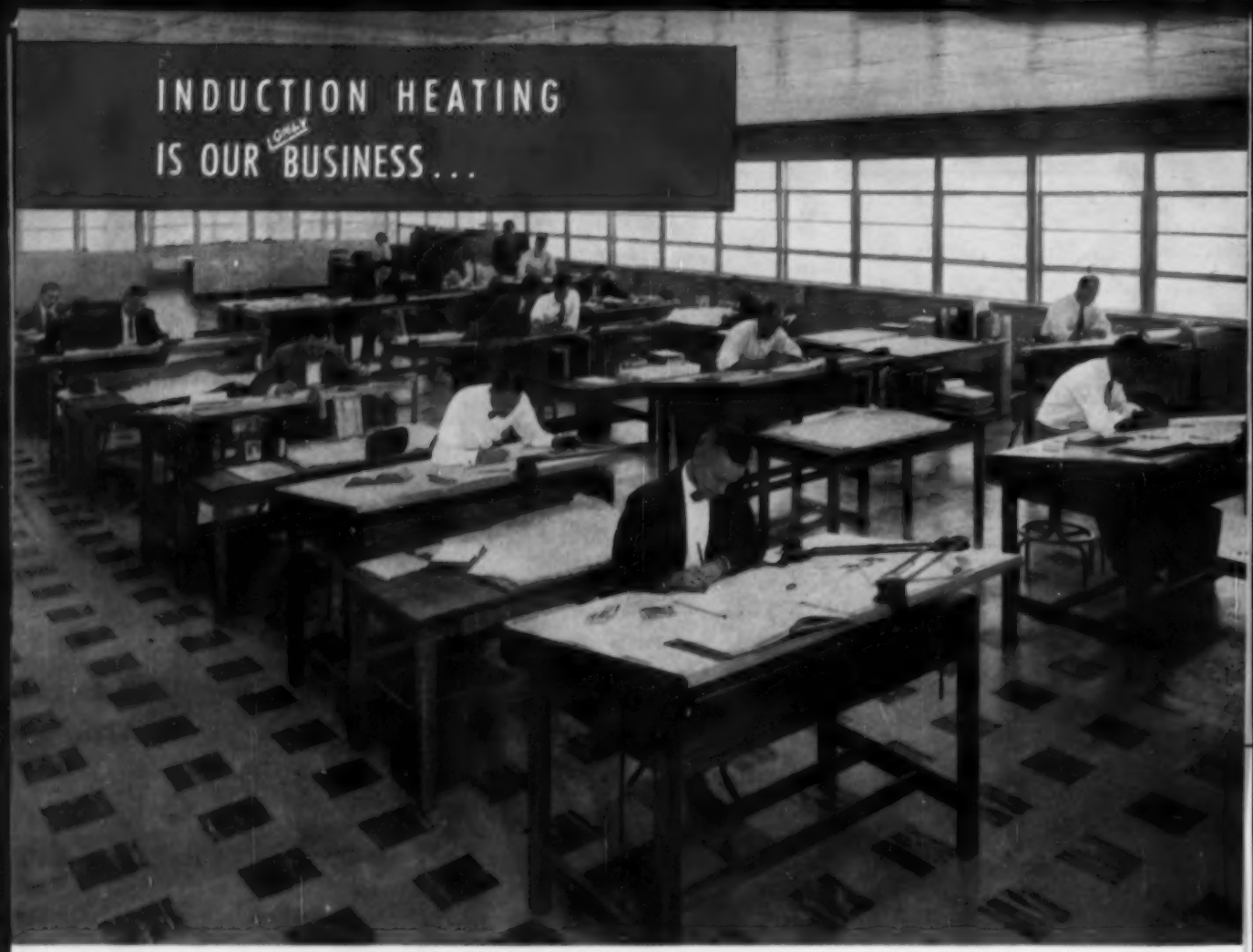
since December, 1954. John C. Sears, executive secretary of the association, says the gain was across the board. Since this industry is considered one of the best bellwethers of industry in general, it's an indication that the economy is headed for not only a good fourth quarter but also a good first half in 1957.

The July sales performance of the gearmakers is significant not only for the gain over June (which was a big vacation month) but also because it set a new record for the index of 287.6 (1947-1949 = 100). The industry is not banking on a new record again this year, but fourth quarter prospects are bright. Backlogs are building up to the best level in the industry's history, standing at nine to ten months. Normal is about three months. Average monthly sales for the year will be about one and a half times the base period, Mr. Sears believes. The only "if" in the picture is the supply of nickel alloys. Castings and forgings are no problem.

To date, the gearmakers have about as much business as they had in all of 1955. They are already assured of peak operations through the first half of next year.

Market Memos

- "It seems inevitable that the pressure of the basic demand will cause a chain of economic and non-economic reactions leading to a definite upturn in housing activity within the next year or so," predicts F. W. Dodge Corp.
- Smith-Corona Inc. says fiscal 1957 sales and earnings are likely to exceed fiscal 1956's "by a wide margin." Two main reasons: 1. Expanding demand for electric typewriters and their application to integrated data processing. 2. Growing market for portable typewriters due to expanding school population and improved standard of living.
- July bookings by the members of the Metal Treating Institute ran 26.7 per cent ahead of July, 1955. Billings for the first seven months of this year are 28.4 per cent ahead of those in the corresponding period last year.
- Members of the National Association of Home Builders were in Washington last week seeking remedial action for the tight mortgage money situation. This has been one of the biggest dampers on housing starts this year, they claim.



Subject at hand . . .

INDUCTION HEATING EQUIPMENT

High · Dual · Low

Your induction heating specs receive full attention here. These engineers are specialists in induction heating equipment. Some are mechanical men . . . others are electrical. Together, they can design the simplest or most complex induction heating equipment, low or high frequency.

Magnethermic's personnel know heat-treating, hot working and joining. They know forging and brazing. Induction heating is our only business.

Magnethermic is the company that answered the need of the aluminum industry back in the '40s for an extrusion billet heater. Now, Magnethermic's expanded organization applies its experience to a full range of induction heating equipment . . . low, dual or high frequency, backed up by complete manufacturing facilities.

A specialist is a good place to place an inquiry. Your inquiry will receive intelligent attention. Induction heating is Magnethermic's only business.

INDUCTION HEATING

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1 TO 10,000 CYCLES

EDWARD S. COE JR.
. . . new position at Farrel-Birmingham

Edward S. Coe Jr., vice president of **Farrel-Birmingham Co. Inc.**, Ansonia, Conn., was appointed general manager, Consolidated Machine Tool Division, Rochester, N. Y. He succeeds **Lester D. Chirgwin**, who requested a leave of absence until his retirement at the end of the year. Mr. Coe was assistant to the president and manager of the Connecticut plants at Ansonia and Derby. He is succeeded as manager by **Graham Hassard**, former superintendent of Farrel's two Connecticut foundries. **Richard D. Mace** was made manager of foundries and is succeeded by **G. Wells Eighmy Jr.** as sales representative for company products in New England. **Gould C. Christensen** will handle company sales in the lower peninsula of Michigan. He was foundry sales manager.

Raymond M. Waggoner, vice president, Pacific Coast sales, **Hubbard & Co.**, was made vice president-general manager of Pacific Coast operations, including management of the Oakland, Calif., plant.

G. H. Rearick, Milwaukee plant manager of **Babcock & Wilcox Co.'s** tubular products division, was named to the staff of W. J. Thomas, company vice president. Mr. Rearick will assist on special work assignments. **Norman E. Wenzel** was promoted to Milwaukee plant manager.

KARL L. LANDGREBE JR.
. . . Wheland v. p.-foundry operations

Karl L. Landgrebe Jr. was elected vice president in charge of foundry operations by **Wheland Co.**, Chattanooga, Tenn.

James B. Wilkie was made manager, gage division, **Pratt & Whitney Co.**, West Hartford, Conn. He was assistant manager, cutting tool and gage divisions.

Inland Steel Co., Chicago, elected **Neele E. Stearns** to the new post of vice president-planning and development. **Lemuel B. Hunter** was made assistant to the president. Changes are effective Oct. 1. **Robert J. Greenebaum** succeeds Mr. Hunter as president of Inland Steel Container Division. He is at present sales vice president of the division and will be succeeded in that post by **J. D. Ray**.

Everett P. Palmatier, former director of research, was named manager, transportation equipment department, **Carrier Corp.**, Syracuse, N. Y. He is succeeded by **Dr. Dewey J. Sandell**.

Ramseyer & Miller Inc., New York, elected **Daniel A. Sutch** president; **C. F. Ramseyer**, chairman; **William Shapiro** and **William Kowalsky**, vice presidents.

Andrew B. Huntington was named chief engineer, **Ross Operating Valve Co.**, Detroit. He was manager of production engineering.

RALPH F. BRENGELMAN
. . . Lunkenheimer purchasing agent

Ralph F. Brengelman was made purchasing agent of **Lunkenheimer Co.**, Cincinnati. He has served as plant manager at Carthage, O., and as an assistant to the president. Early in 1956, with consolidation of the Carthage iron and steel valve operations and the bronze valve plant at Fairmount, O., Mr. Brengelman joined the purchasing department as a special expediter.

Lester J. Herrick, general manufacturing manager, **New Process Gear Corp.**, Syracuse, N. Y., was named operations manager. He succeeds **David H. Brown**, now president and general manager. Mr. Herrick is succeeded by **Arthur B. Biesemeyer**, former plant manager, sewing machine and small parts division.

Alva W. Phelps was elected president, **Oliver Corp.**, Chicago, continuing as chairman. He succeeds **A. King McCord** who resigned early in August to become president of Westinghouse Air Brake Co. **Carl L. Hecker** was elected executive vice president.

R. C. Colbaugh was appointed assistant vice president-industrial engineering, **United States Steel Corp.**, Pittsburgh. He is succeeded by **C. W. Iams** as assistant to general manager, operations-steel. Mr. Iams was assistant to the general superintendent, Gary Steel Works, Gary, Ind., where **Stephen**

M. CLEIGHTON HILBERT
. . . Coffing Hoist Div. gen. mgr.

DAVID WENNER
. . . Michigan Crane & Conveyor v. p.

G. Basic was made superintendent-production planning department to succeed **George Nomanson**, retired.

M. Cleighton Hilbert, former plant manager, Crescent Industries, was named general manager of **Duff-Norton Co.'s** Coffing Hoist Division, Danville, Ill.

Chrysler Corp., Detroit, named **Arthur Fields** purchasing agent of nonproduction materials. He was purchasing agent, axle and transmission division, and is succeeded by **Chester J. Quinlan. Stephen J. Roach**, former purchasing agent for Dodge Truck, was named purchasing agent for missile operations in the Defense Operations Division.

Robert M. Hatfield, vice president, **Combustion Engineering Inc.**, New York, was appointed general sales manager. Formerly vice president of the western division with headquarters in Los Angeles, he is succeeded as manager of that operation by **Frank M. Bader**, an assistant general sales manager in New York.

Wendell Sprong was appointed production manager at **Wagner Iron Works**, Milwaukee. He was assistant production manager.

Clarence H. Sleeman was appointed chief mining and development engineer of **Jones & Laughlin Steel Corp.'s** ore mines and quarries division. He has headquarters in Pittsburgh.

David Wenner was elected vice president, **Michigan Crane & Conveyor Corp.**, Detroit. He is in charge of engineering.

Avery C. Adams, president of Pittsburgh Steel Co., Pittsburgh, was elected president of **Jones & Laughlin Steel Corp.**, Pittsburgh. He succeeds **C. L. Austin**, now vice chairman of the board and chairman of the newly formed finance committee. Changes are effective Oct. 1. At **Pittsburgh Steel, Allison R. Maxwell Jr.**, vice president-sales, becomes president. **H. B. Collamore**, a member of the executive committee, was elected board chairman. **E. M. Barber**, executive vice president, was promoted to the new post of vice chairman of the board. **Richard McL. Hillman** becomes vice president-treasurer; **Joseph G. Smith**, vice president-purchases and raw materials.

Richard M. Ervin was made manager of **Hyster Co.'s** Washington office and district manager of the east central industrial truck division. He replaces **Robert E. Lange**, named resident manager of the Hyster subsidiary plant to open in Sao Paulo, Brazil.

William V. Rathbone was elected vice president-sales, **Delta Tank Mfg. Co.**, Baton Rouge, La. He was executive vice president, Parkersburg Rig & Reel Co.

Erwin Tomash was elected president, **Telemeter Magnetics Inc.**, Los Angeles.

Paul Dollard was elected president and general manager, **Century Engineers Inc.**, Los Angeles.

Edgar G. Morrison was made sales manager, **Goss Printing Press Co.** and subsidiaries, Chicago.

Lamson Corp., Syracuse, N. Y., reorganized into separate sales and engineering groups — engineered systems and allied products. **Carroll Hennessy**, newly elected vice president, will manage engineered systems; **Vernon C. Story**, allied products. **Harry C. Keller** was elected a vice president in charge of new product research and spe-

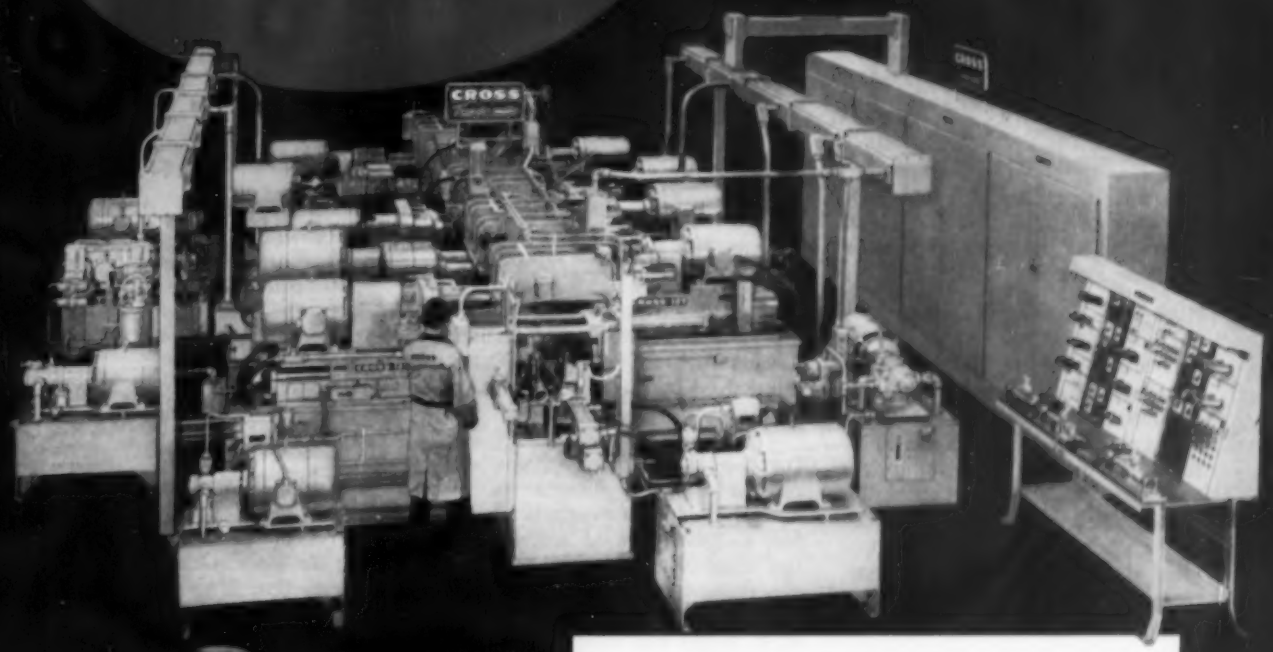
AVERY C. ADAMS

ALLISON R. MAXWELL JR.

. . . Jones & Laughlin and Pittsburgh Steel presidents

Bores, Drills Chamfers, and Taps Rear Axle Housings

Another Transfer-matic by Cross



- ★ Rough and finish bores two tube holes; rough and semi-finish bores differential case bearing seats; rough and semi-finishes pinion shaft bore; drills, chamfers and taps ten cover screw holes.
- ★ 75 pieces per hour at 100% efficiency.
- ★ Twenty-two stations: one for loading, one for unloading, four for boring, two for back-boring, two for drilling, one for tapping, one for turn-over and ten for inspection.
- ★ Lift and carry transfer mechanism.
- ★ Cross Modular Unit Construction provides flexibility for part design changes.
- ★ All parts in Cross Machines—even details—are made to interchangeable tolerances for fast, easy maintenance.
- ★ Other features: Construction to JIC standards, hardened and ground ways, hydraulic feed and rapid traverse for boring and drilling, individual lead screw feed for tapping, automatic lubrication.

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cial developments. **O. W. Acheson**, also elected a vice president, will be in charge of manufacturing operations and standard product improvement. **Francis D. Weeks** was elected first vice president. He continues as president of Lamson Corp. of Delaware, parent company, and president of Lamson Mobilift Corp., Portland, Oreg.

Wheeling Steel Corp. appointed **Paul L. Wharton Jr.** assistant general manager of its Martins Ferry, O., factory. **Howard D. Foster** was named engineer of standards in the operations division.

Van B. Phillips, former midwest regional manager for **Recordak Corp.**, was appointed assistant general sales manager and is in the New York offices.

Robert H. Hudson was made production metallurgist at the Gambrinus, O., plant of **Timken Roller Bearing Co.** He was forge shop metallurgist in the mill metallurgical group. He succeeds **David C. Ladd**, promoted to metallurgical engineer-production at Canton, O. **Wilbur G. Bischoff**, who held the latter position, was made metallurgical engineer in charge of customer service work in the steel division.

W. S. Sherk was made technical director of operations, **Electro Metallurgical Co.**, division of Union Carbide & Carbon Corp. at Niagara Falls, N. Y. He succeeds **Paul McVicker**, now general manager, product and process development department.

Bound Brook Oil-Less Bearing Co., Bound Brook, N. J., appointed **M. J. Connolly Jr.** assistant sales manager.

WALTER KASSEBOHM
. . . Marchant Calculators exec. v. p.

NORMAN D. RICE
. . . Inland Steel Products v. p.

Walter Kassebohm, a senior manufacturing executive of **Marchant Calculators Inc.**, Oakland, Calif., was named to the new post of executive vice president-operations.

Dr. George H. Wagner was appointed assistant director of research, **Linde Air Products Co.** He will be in charge of activities at the Tonawanda, N. Y., and Indianapolis laboratories.

R. V. Miller was made manager of weights, measures and sanitary standards at **Toledo Scale Co.**, Toledo, O. He succeeds **S. Q. Bennett**, retired.

Donald Des Lauriers was made plant manager, **Mercury Mfg. Co.**, Chicago.

Richard C. Lawton was named New England representative for the bearing division of **McGill Mfg. Co. Inc.**, Valparaiso, Ind.

Norman D. Rice was appointed vice president-manufacturing and engineering by **Inland Steel Products Co.**, Milwaukee. He became vice president - engineering in April.

E. J. Formhals was made general manager of Canadian operations for **Progressive Welder, Canada Ltd.** He has headquarters in Chatham, Ont.

Allen M. Harrelson was named vice president and treasurer, **H. K. Porter Company Inc.**, Pittsburgh.

B. V. Edridge was appointed controller, **Henry Disston Division**, H. K. Porter Company Inc., at Philadelphia.

V. H. Sutherlen succeeds **G. R. Jones**, retired, as general sales manager, **Oldsmobile Division**, General Motors Corp., Lansing, Mich.

OBITUARIES . . .

William J. Palmer, 66, vice president-manufacturing, **Phelps Dodge Copper Products Corp.**, New York, died Aug. 30.

Elmer Kynberg, 62, general sales manager, **Cyclone Fence Department**, American Steel & Wire Division, U. S. Steel Corp., Chicago, died Sept. 1.

Charles Wickwire, 77, president, **Wickwire Bros. Inc.**, Cortland, N. Y., died Aug. 20.

Eugene W. Krueger, 79, chairman, **Worden-Allen Co.**, Milwaukee, died Aug. 25.

Oliver Peace, 64, vice president-manufacturing, **Humason Mfg. Co.**, Forestville, Conn., subsidiary, Stanley Works, died Aug. 23.

Charles L. Corwin, 71, former sales manager, **Champion Spark Plug Co.**, died Aug. 17 in Toledo, O.

Arthur J. Boyer, 67, a Philadelphia sales representative of **E. F. Houghton & Co.**, died Aug. 20.

Henry E. Arnsby, 52, general sales manager, **United Steel Fabricators Inc.**, Wooster, O., died Aug. 27.

Alexander G. Long, 65, former vice president and factory manager, **American-LaFrance-Foamite Corp.**, Elmira, N. Y., died Aug. 21.

Backbone for any job . . .

"Solid-Back" Column

. . . New Kearney & Trecker TF Series milling machines have it . . . backbone for the precise tool room job and . . . plenty of beef for rugged duty milling

TF Series milling machines available under Tool-Lease program.

THE solid-back column is an outstanding example of Kearney & Trecker advanced engineering. This one-piece, cross-ribbed, solid-back column is the most important single element of the machine. Every inch of metal is scientifically distributed to add rigidity where it's needed the most. Thus the column readily absorbs all the heavy work loads supported by the heavier, wider knee, and also all torsional thrusts to the cutter transmitted through the heavy-duty, three-bearing spindle and double overarms.

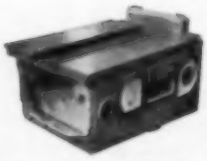
What's more, the heavier column base is specially designed for the new, exclusive twin screw knee support — the only balanced-design arrangement offered today.

In addition, the new TF's give you other outstanding design and operating features, never before available on any knee-type milling machines. TF milling machines are built in five sizes — No. 2 to No. 6 from 10hp to 50hp in Plain, Universal and Vertical styles.

For facts and figures that will help you — ask about TF's — the latest in milling machines. Contact your Kearney & Trecker representative — call him or mail coupon direct to factory today.

A few more of many reasons why TF Series milling machines are way out front in rigidity

Twin Screw Knee Support — Exclusive double-support arrangement most effectively distributes weight of new machines' much wider, heavier knee, saddle and table. Balanced design substantially increases stability under heaviest loads . . . offers greater resistance to torsional thrust under all cuts . . . halves the wear factor, assuring greater, longer-lasting accuracy.



Heavier, Wider, One-Piece Knee — The TWIN SCREW arrangement supports the heavier, larger knee. Span and length of ways are increased considerably, providing fuller saddle support . . . lasting accuracy . . . substantial reduction of way and gib wear.

Three-Bearing Spindle — Complete assembly consists of three heavy-duty bearings, flywheel, a train of wide-faced forged steel gears. Rigidity of spindle unit contributes to increased cutter life . . . excellent finish . . . quieter and vibrationless operation under all cuts.

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Please send me Catalog No. TF-50 with details on new line of TF Series Plain, Universal and Vertical milling machines.

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new high strength OXIDE cutting tool

STUPALOX

Cuts cast steel, cast iron, chilled iron, carbon steel, high-speed steel, non-ferrous metals

Performance up to ten times the speed and four times the wear-resistance of other tools

for example

High-Speed Steel In machining high speed steel (207-B annealed) with hardened high speed steel tools, cutting speed was from 80 to 100 sfpm. Stupalox provided a cutting speed of 505 sfpm with .023″ feed and .125″ depth of cut.

SAE 1035 Steel SAE 1025 steel was cut with tungsten carbide tools at a speed of 250 to 350 sfpm. Stupalox cut the same material on the same machine at 1175 sfpm. Feed was varied from .015 to .005 and the depth of cut from .005 to .250 to demonstrate the tool's versatility.

• • •

STUPALOX is the result of thirty years of development of special-purpose oxides, by Stupakoff, one of the country's leading manufacturers of technical ceramic products. Stupalox tools are available *now*, in commercial quantities, and in a variety of sizes and shapes. Write for complete information and technical data.

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STUPAKOFF DIVISION OF

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WRITE DEPT. S LATROBE, PENNSYLVANIA

Galvanizers Unite

Midwest Job Galvanizers Association will promote improved quality of hot dip coatings

MIDWEST Job Galvanizers Association has been organized to represent the jobbing hot dip galvanizing industry and to advance the quality of coatings through a vigorous quality control program.

In line with this policy, the association requires its members to maintain membership in the American Society for Testing Materials. They must guarantee that all galvanizing work is done in compliance with ASTM specs. The organization also has set up a well defined, aggressive program to bring the value of its members' services to the attention of manufacturers of iron and steel products. About 15 per cent of all steel rolled in the U. S. is galvanized for protection against rust which destroys an estimated $3 million to $5 million worth of steel products annually.

Officers—Address of the association is P. O. Box 72, Chicago 50, Ill. Officers are: President, Irving M. Herrmann, Acme Galvanizing Inc., Milwaukee; vice president, Merrill H. Bankard, Roxana Galvanizing Co., East Chicago, Ind.; secretary-treasurer, Fred C. Brightly Jr., Brightly Galvanized Products Inc., Cicero, Ill.

Miller Metal Rebuilds Plant

Miller Metal Products Inc., Baltimore, is rebuilding the portion of its plant which was destroyed by fire some months ago. The 25,000-sq-ft structure will be replaced and an additional 10,000 sq ft added. The firm, headed by M. M. Miller, makes kitchen cabinets and other units.

Brass Firm Renames Division

American Brass Co., Waterbury, Conn., changed the name of its Waterbury Brass Goods Division to Fabricated Metal Goods Division. This division makes specialties from flat or sheet metal, particularly products of small size and close tolerance. John A. Wright is vice president in charge of this division. American Brass Co. is a wholly owned subsidiary of Anaconda Co.

Hills-McCanna Building

Hills-McCanna Co., Chicago, is building a $1.25-million plant at Carpentersville, Ill. The 100,000-sq-ft facility will turn out chemical metering and proportioning pumps, force-feed lubricators and diaphragm valves.

Schaffner Lifts Plant Capacity

Schaffner Mfg. Co. Inc., Emsworth, Pittsburgh, is adding 15,000 sq ft to its buffing compound and buff plant. The additional production space will be used to manufacture its new metal-center, air-cooled bias (type) buffs.

Gerotor Building Plant

Gerotor May Corp., Baltimore, maker of hydraulic pumps, motors and other equipment, is building a 72,000-sq-ft plant at Reisterstown and Painters Mill roads, that city. E. E. Yaggy Jr. is president.

AMF Atomics Gets Contract

AMF Atomics (Canada) Ltd., a subsidiary of American Machine & Foundry Co., New York, has been awarded a long-term contract to fabricate fuel elements for Atomic Energy of Canada Ltd., Canada's equivalent of our AEC. AMF Atomics will build a 30,000-sq-ft plant at Port Hope, Ont., to carry out the contract. This will be the first unit of a large nuclear facility.

Gardner-Denver Builds

Gardner-Denver Co. and its Keller Tool Division, Quincy, Ill., will occupy branch offices in a building being erected at 12700 Capital Ave., Oak Park 37, Mich. The Detroit office is under the supervision of E. A. Hanson, district manager.

Forms Joint Firm in France

Vanadium-Alloys Steel Co., Latrobe, Pa., and Compagnie des Forges, Paris, have organized a new company, Societe Commentryenne des Aciers Fins Vanadium Alloys. The firm will specialize in high speed and tool steels. Its plant at Commentry is equipped with four bar mills, four hot sheet mills and a 36-in., 4-high cold sheet mill. Electric furnace melting equipment and hammers will be added. Jean Paul Elkann, Vanadium-Alloys' vice president of exports, will head the new company.

Coal Handling Stepped Up

These continuous bucket lines, shown unloading a 900-ton coal barge at the river docks of United States Steel's Clairton (Pa.) Works, form a new link between the company's river fleet and its coke and coal chemical facility

Luria Dismantling Buildings

One of the largest offerings of steel buildings for re-erection is announced by William J. Conway, manager of new steel operations, Luria Bros. & Co. Inc., Philadelphia. Involved are ten major industrial units covering 2.3 million sq ft. They were part of the operation of the Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

The buildings, ranging from 30,000 to 1.1 million sq ft, will be dismantled. Thirty thousand tons of structural steel will be made available to help alleviate the shortage in the steel fabricating industry. One unit, covering 25 acres of floor space under one roof, is considered to be the largest industrial facility available today. Luria Bros. previously dismantled 6500 tons of the plant. This steel was re-erected in new buildings.

Included in the acquisition are

power substations complete with transformers, switch gear, rotary converters and motor generator sets; a boiler plant with steam capacity of 600,000 lb per hour; and 129 overhead traveling cranes.

Solar Enlarging Plant

Solar Aircraft Co., San Diego, Calif., is expanding its factory in Des Moines, Iowa, by more than 25 per cent. The 117,000-sq-ft addition to the present Wakonda plant will be completed this year. Expansion was required by a substantial increase in the firm's production of jet engine components.

GE Renames Department

General Electric Co., Schenectady, N. Y., changed the name of its Trumbull Components Department to Circuit Protective Devices Department. Its products include: Molded case circuit breakers; safety switches, panelboard and switchboard components and accessories; disconnect switches, open knife switches; and service entrance equipment, such as circuit breaker load centers, fuse puller switches and general use switches.

J&L Plans Health Center

Jones & Laughlin Steel Corp., is constructing a health center on Carson street, between 28th and 29th streets, Pittsburgh. Completion is scheduled for early 1957. Estimated cost, including building and equipment, is $400,000. The center is another link in an industrial medicine program, with emphasis on preventive medicine, officials say.

De Laval Opens Branch Office

De Laval Steam Turbine Co., Trenton, N. J., opened a branch sales office at 1610 Fifth Ave., Moline, Ill. H. A. Besocke is manager.

Admiral Enlarging Plant

Admiral Corp., Chicago, is constructing a 40,000-sq-ft building for servicing and storing refrigerator systems at its appliance center in Galesburg, Ill. The company also announced a 180-ft long extension to its pressroom and construction of 6500 additional ft of interbuilding conveyors. Admiral will have over 7.5 miles of conveyors of all types in use when the additional material handling equipment is completed.

Will Build Laboratory

United States Borax & Chemical Corp. will build a research laboratory at Anaheim, Calif. In addition to numerous standard laboratories, special facilities will be provided: A distillation room, an instrument laboratory and a heavy experimental room. Completion is scheduled for late in April, 1957. Cost: About $850,000.

Superior Enters New Field

Superior Tube Co., Norristown, Pa., will produce aperture masks (a component of picture tubes for commercial color television receiving sets) in its newly created department at plant No. 3, Phoenixville, Pa. The mask, a curved sheet of metal, contains hundreds of thousands of tiny holes.

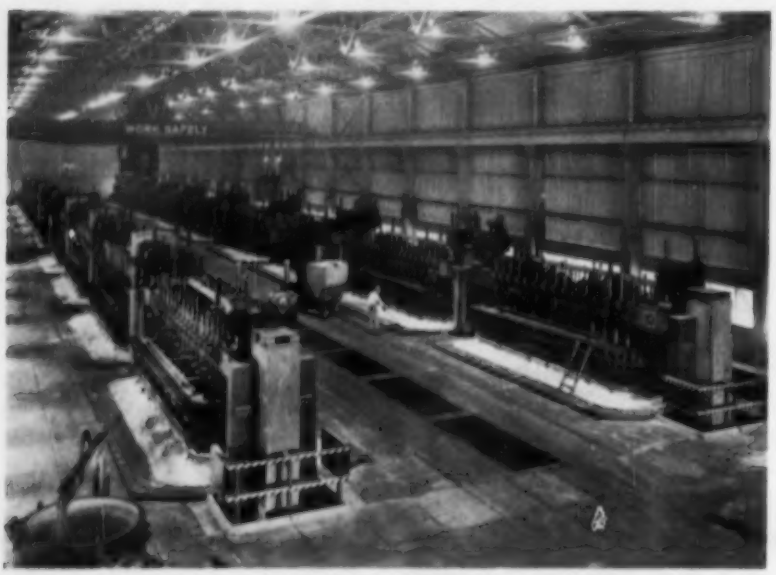
Steel Distributor Expands

Vinson Steel & Aluminum Co., Dallas distributor, is spending about $1.25 million to construct a Houston office and warehouse. Granville B. Lane, president, will make his headquarters in Houston.

Olin Revere Metals Formed

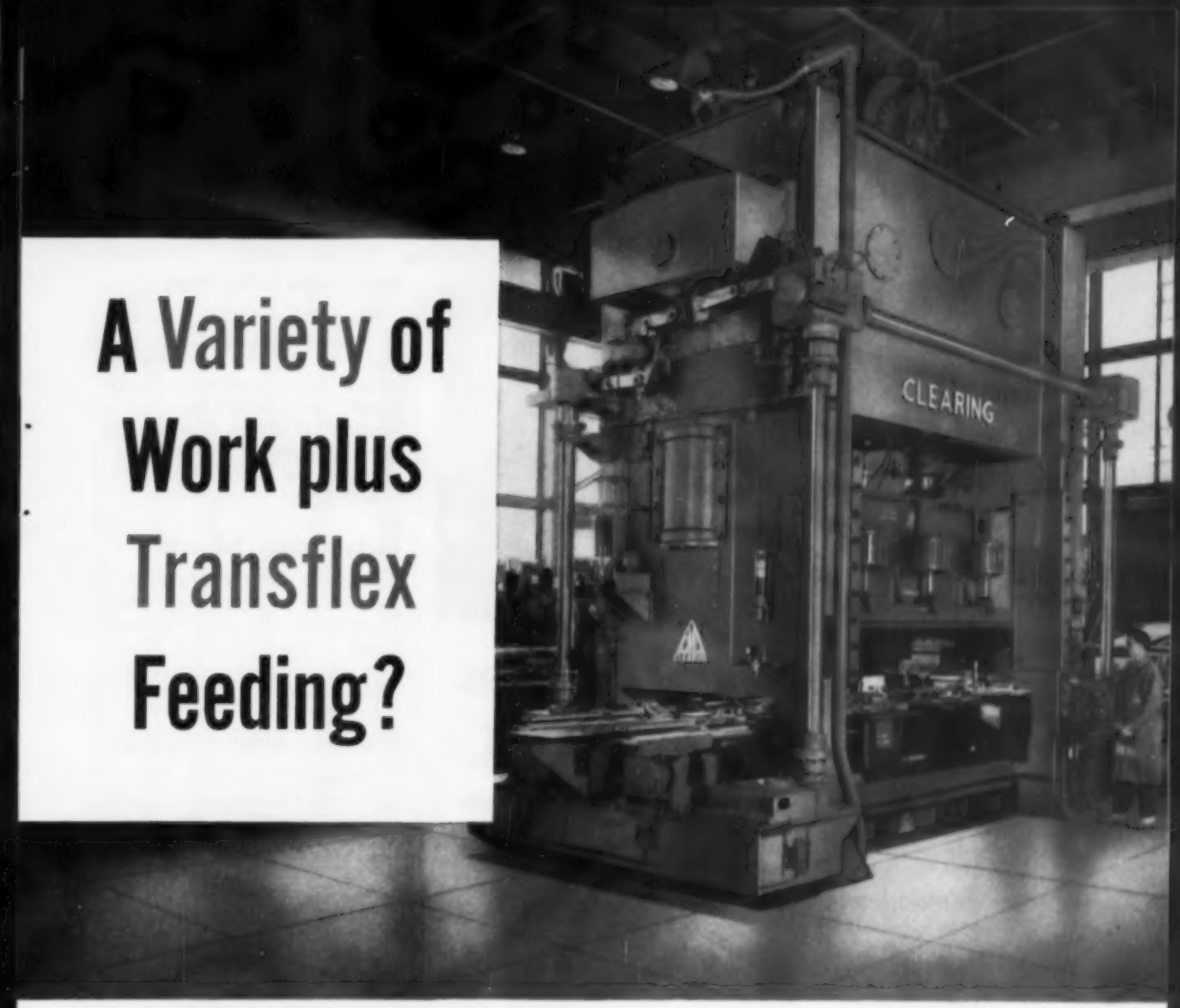
Olin Mathieson Chemical Corp. and Revere Copper & Brass Co. Inc., New York, officially confirmed the report (STEEL, Aug. 27, p. 140) that they will join forces to bring in additional aluminum pig and ingot capacity. The jointly owned company, Olin Revere Metals Corp., will operate a plant at Olin Mathieson's original aluminum site near Clarington, O. Walter F. O'Connell has been named president.

The plant's capacity will triple the 60,000 tons originally planned. Capacity production is scheduled to begin late in 1958. Olin Revere will also have an alumina plant with a capacity of 350,000 tons on the Gulf Coast to process bauxite brought in from mines of N. V. Billiton in Surinam, Dutch Guiana. Power generating units at Cresap, W. Va., will be a third facility. Olin Revere will own two of three



New Potline Boosts Capacity at Kaiser's Aluminum Plant

Eighteen new reduction cells are in operation at Kaiser Aluminum & Chemical Corp.'s Tacoma, Wash., aluminum reduction plant. The 100,000-ampere vertical stud Soderberg pots are nearly twice the size of the 240 conventional pots now in operation at Tacoma. They increase the plant's annual primary aluminum capacity by over 10 million lb to 77 million lb. In addition to the new potline, the $2.25-million expansion project at the plant includes the building which houses the cells, an office-laboratory building and another power substation



A Variety of Work plus Transflex Feeding?

Ask JARECKI about the new CLEARING TRANSFLEX

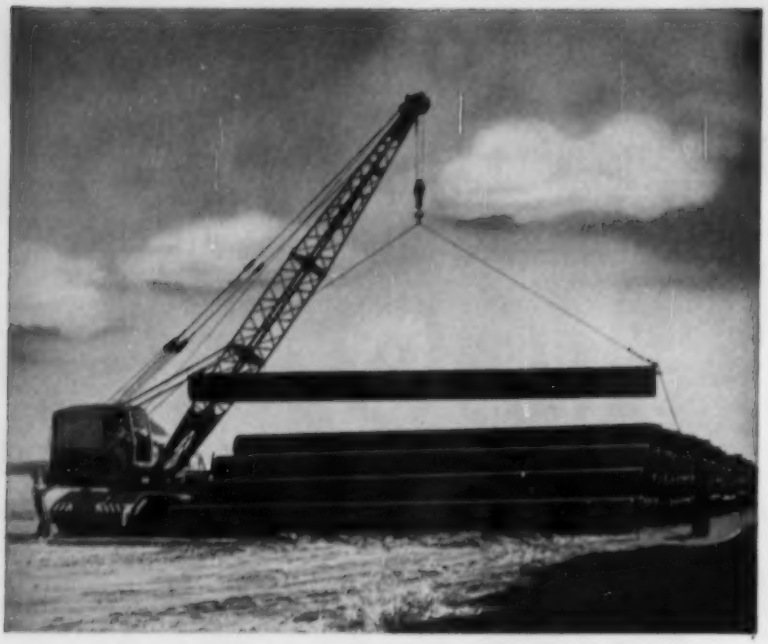
Closeup of Transflex feed which is now adjusted to automatically feed an automotive valve cover stamping.

Today Jarecki Corporation is running valve covers on this new Clearing Transflex in their Grand Rapids Plant. Tomorrow? Who knows? Jarecki is a job shop with a wide variety of orders to fill and tomorrow may bring an automotive or appliance stamping run where delivery and quality are vital. That's why Transflex—Clearing's new concept of flexible automation—found immediate acceptance at Jarecki. Their new 600 ton press gives them the advantages of automatic transfer feeding, yet it's no single-purpose machine. Feed fingers change easily to accommodate different sized parts; the feed stroke is adjustable to take a wide range of jobs. Knockouts are universal and cushions also adjust laterally in the bed. If you have need for increased efficiency in your stamping operation, but have always thought of transfer presses as single-purpose machines, find out about Transflex. Call on a Clearing engineer for the full story.

CLEARING PRESSES

THE WAY TO EFFICIENT MASS PRODUCTION

CLEARING MACHINE CORPORATION • **Division of U. S. Industries, Inc.**
6499 W. 65th Street, Chicago 38, Illinois • **Hamilton Plant, Hamilton, Ohio**



How TRANSIT CRANE features can cut your handling costs

Material handling is more economical with Transit Cranes because these mobile machines have *more* of the features you need *most* to bring savings all down the line. Here are a few of these features and what they can mean to you on material handling jobs.

POWER CONTROLLED LOWERING for main hoist line on lifting crane permits delicate positioning of loads.

FRICTION SWING BRAKE, in addition to regular swing lock, permits more accurate spotting and holding of boom point over desired position.

INDEPENDENT BOOM HOIST WITH POWER CONTROLLED LOWERING provides extreme accuracy in load handling by enabling operator to boom up or down at any phase of the cycle.

SAFETY BOOM STOPS on lifting cranes are designed to prevent boom from accidentally snapping over center and striking cab.

PENDANT-TYPE BOOM SUSPENSION with 8 parts of operating line between bridle and boom point is ideal for changing boom lengths conveniently.

Transit Cranes are available in two sizes — the 15-ton 15-B and 25-ton 22-B. Ask your nearby Bucyrus-Erie distributor for full information on the size machine that will best serve your needs.

747E56

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY

South Milwaukee, Wisconsin

225,000 kw generating units in the new power plant to be built there by Ohio Power Co.

Olin Mathieson will take 120,000 tons of the new company's annual output, Revere, the remaining 60,000 tons.

Boice Gages Builds Plant

Boice Gages Inc., Staatsburg, N. Y., constructed a plant at Hyde Park, N. Y. The structure will permit the firm to triple its production and provides space for expansion. It makes dial indicator-type gages and is recognized as a leader in the adjustable reference master field.

Rockwell Opens Laboratory

Rockwell Mfg. Co. opened its gas meter research and development laboratory at Dubois, Pa. Lloyd A. Dixon Jr. is vice president in charge of the Meter & Valve Division.

Plans General Office Building

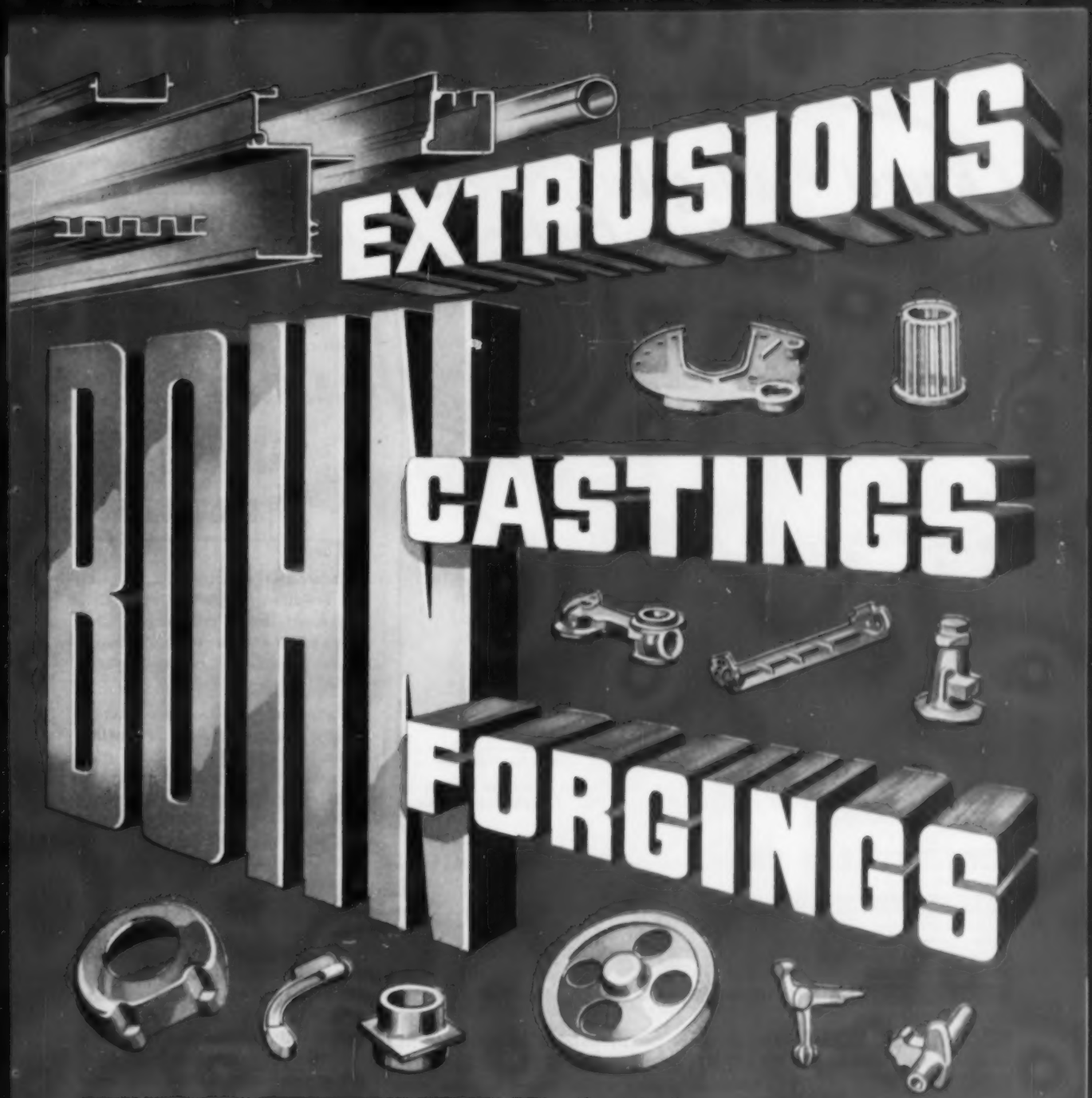
Youngstown Sheet & Tube Co. will build a general office building south of Boardman Center on Market street, Youngstown. It will have a total floor area of about 183,000 sq ft and will be ready for occupancy late in 1957. Architects are Garfield, Harris, Robinson & Schafer, Cleveland.

Circo Organizes Subsidiary

Circo Equipment Co., Rahway, N. J., organized a subsidiary, Circo Cleaning & Finishing Equipment Corp. The new firm will design and make washers for metal parts, power spray washers, dryers, ovens and complete finishing systems. Melville Morris is president; Jerome Scherzer, vice president; Stanford Barlett, manager; Henry Stanly, chief engineer.

Shipbuilding Firm To Expand

Maryland Shipbuilding & Drydock Co., Fairfield, Baltimore, received a certificate of necessity from the government for about $1 million. This sum will be expended for machinery and other equipment in a program which includes the enlargement of its heat ex-



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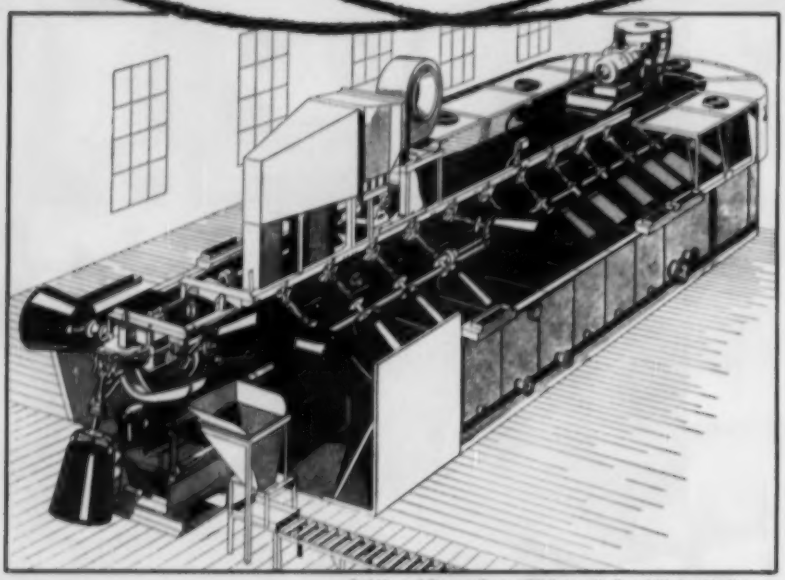
Barrel Plating by Stevens Really Cuts Costs



End View of Stevens Super "L" Automatic Barrel Plating Machine.

Since Stevens first introduced the Automatic Barrel machine scores of industries have enjoyed these operational advantages. Check them against your present operations.

MINIMUM LABOR REQUIRED — In most cases, one unskilled employee can operate the machine.

HANDLES THE COMPLETE CYCLE — Including cleaning, pickling, chromate treatments, plating, bright dip and drying.

COMPLETELY AUTOMATIC — No barrel lids to fasten and unfasten during automatic loading and unloading.

BETTER HANDLING — No mixing of parts. Becomes a part of a straight line production system.

NO HEALTH HAZARD — Occupational health hazards eliminated with ventilation of equipment.

UNIFORMITY OF PLATE — Accurate plating cycles timed to meet your requirements.

FITS ANY PLANT LOCATION — Does not need special buildings—Can be moved at any time. Low head room.

DEPENDABLE — Scores of machines in use. Machine design and construction constantly improved.

LOW INITIAL COSTS — For average operation lowest initial machine costs.

LOW MAINTENANCE COSTS — Proven over years of use and in varied operations

FREDERIC B. STEVENS INCORPORATED — YOUR METAL FINISHING SUPERMARKET

Let a Stevens Sales Engineer show you how you can cut costs in your plating operation with a Stevens Automatic Barrel. Write us direct. Frederic B. Stevens, Inc., 1816-18th Street, Detroit 16, Michigan.

METAL FINISHING EQUIPMENT AND SUPPLIES, FROM CASTINGS OR STAMPINGS TO FINISHED PRODUCT

BRANCHES:

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Offices in Principal Cities

change equipment department. George H. French is president.

NEW ADDRESSES

J & D Tool Co. moved its plant to 12 Research Drive, P. O. Box 206, Glenbrook, Conn.

Dust Suppression & Engineering Co. moved its office to 120 S. Broadway, Lake Orion, Mich.

Grip Nut Co. moved its offices and plant to South Whitley, Ind.

CONSOLIDATIONS

Caterpillar Tractor Co., Peoria, Ill., acquired **Englehart Mfg. Co.**, Davenport, Iowa, producer of precision parts and one of Caterpillar's major suppliers of noncurrent parts.

Valley Metal Products Co., a wholly owned subsidiary of Mueller Brass Co., Port Huron, Mich., purchased all of the machinery, equipment, inventories, patents, trademarks and tradenames of the **Window Division of Industrial Machine Tool Co. Inc.**, Fenton, Mich. This division makes awning-type aluminum windows.

Superior Brass Works Inc. purchased all the machinery, equipment and inventory of Kendrick Mfg. Co. These Detroit companies make cast bronze bushings and bearings. Superior will continue manufacturing operations at the Kendrick plant for several months, but will move operations to its own plant as soon as necessary alterations are completed.

Aeroquip Corp., Jackson, Mich., acquired **General Logistics Corp.**, Pasadena, Calif., specialist in the design and manufacture of load control and tie-down equipment for aircraft and trucks.

American Hoist & Derrick Co., St. Paul, purchased the complete plant, some of the product inventory and major facilities of **Lebus Rotary Tool Works Inc.**, Longview, Tex. Lebus makes drop forged

DEMONSTRATION of slack in conductors is shown when Anaconda preassembled reverse-lay aerial cable is untwisted. Opened cables enable linemen to make connections easily—without cutting conductors or messenger.

Built-in slack helps linemen make quick taps —with Anaconda reverse-lay aerial cable

When transformers, cutouts or laterals make numerous connections necessary — Anaconda reverse-lay aerial cable permits easy separation of conductors whenever the need arises.

Lay of the conductors is reversed approximately every five feet — within easy reach of linemen. Unwound between reversal points, conductors have sufficient slack to eliminate the need for cutting conductor or messenger when making connections.

"Hot" taps can be made on 5kv nonshielded cables, eliminating power shutdowns. Opened cable allows use of wire guards and rubber blankets between the conductors for greater safety.

Ask the Man from Anaconda for full details. Call or write to: Anaconda Wire & Cable Company, 25 Broadway, N. Y. 4, N. Y.

SEE THE MAN FROM **ANACONDA®**

FOR **AERIAL CABLE**

Ferrocolumbium

MCA *now...*

a new source

The use of Columbium is now free of any restrictions and may be again employed as a valuable alloying material, recognized for improving high temperature properties and increasing corrosion resistance.

In announcing the addition of this product to its line of metallurgical alloying elements, the same reliable MCA technology is offered that has distinguished MCA molybdenum, tungsten, boron and rare earths . . . faithful uniformity in fulfilling specifications . . . deliveries to accurately anticipate customer's requirements.

Further, the sources of supply for the raw material are plentiful, and will continue to increase.

MCA Ferrocolumbium is available in a variety of screen sizes to meet manufacturing requirements. It will pay you to investigate this new supply source, today.

MOLYBDENUM

Grant Building CORPORATION OF AMERICA **Pittsburgh 19, Pa.**

Offices: Pittsburgh, Chicago, Los Angeles, New York, San Francisco
Sales Representatives: Brumley-Donaldson Co., Los Angeles, San Francisco
Subsidiary: Cleveland Tungsten, Inc., Cleveland
Plants: Washington, Pa., York, Pa.

MCA

tools, including oil field snatch blocks and load binders. John McEvoy is general manager of the Texas plant.

REPRESENTATIVES

Babcock & Wilcox Co. appointed Anthony D. Zar sales representative in charge of the Milwaukee district sales office of its Tubular Products Division. Succeeding Mr. Zar as manager of the general sales office in Milwaukee is Kenneth W. Harris.

Rivett Lathe & Grinder Inc., Boston, appointed Overgard Machine Tool Co. Inc., Denver, as distributor in the Colorado-New Mexico territory for its machine tools.

H. K. Porter Company Inc.'s Leschen Wire Rope Division, St. Louis, appointed M. M. Muse as district sales representative in the eastern two-thirds of Kentucky and Tennessee and the northern half of Alabama.

Diamonite Products Division, United States Ceramic Tile Co., Canton, O., appointed Fayjan Tool Sales Co., Williamsport, Pa., representative in that area for its oxide cutting tools.

John E. Meyer Co., Dallas, was appointed representative of **Jones & Laughlin Steel Corp.'s Container Division** for the distribution of galvanized ware in Texas and Oklahoma.

Timken Roller Bearing Co.'s Steel & Tube Division, Canton, O., appointed Ford Steel Co., St. Louis, a distributor of its graphite tool steels.

Axelson Mfg. Co., Los Angeles, named Keen Machinery Co., Cincinnati, and Montague-Harris & Co., Los Angeles, stocking distributors for the company's line of milling machines.

Metalwash Machinery Corp., Elizabeth, N. J., appointed these representatives in the Degreaser Division: Howard F. Brennan, northern New Jersey; J. W. Harvey, the Chicago area.

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THE PERFECT PAIR

FOR SPEED • STRENGTH • SAVINGS

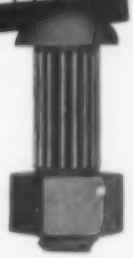
The efficiency of the ANCO Lock Nut and Structural Rib Bolt is found in the two man team—one man with a maul and one with an ordinary wrench—can place these bolts in far less time than the fastest riveting team.

The ⅝" diameter ANCO Structural rib bolts are stronger than ¾" diameter rivets—with shear and bearing values that far exceed hot driven rivets and guarantee a minimum tensile strength of 70,000 pounds per square inch.

There is no extra equipment problem—no costly replacement of condemned rivets—no time lag or man hour loss with the ANCO team that has proved again and again to be far less expensive than any other type of bolted construction.

ANCO Structural Rib Bolts and ANCO Lock Nuts are approved and used in all types of steel construction; buildings, bridges, T. V. and hi-tension towers, oil refineries, hangars, etc. ANCO Lock nuts are also used on Standard Machine Bolts for bolted construction.

Send for samples and information today.



ANCO LOCK NUTS

Automatic Locking Feature, of chrome vanadium steel with high percentage of nickel, is integral part of nut.

ANCO Structural Rib Bolts and ANCO Lock Nuts are finished black galvanized, cadmium plated, etc. Galvanized to meet A. S. T. M. Specs.—hot dipped and subjected to Preece Tests.

AUTOMATIC NUT COMPANY, INC.
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Fairless Works

uses

RESEARCH-COTTRELL PRECIPITATORS

for these gas cleaning jobs

Eleven Research-Cottrell Precipitators, handling 927,160 cubic feet of gas per minute with collection efficiencies of 95% and over, are installed or are being installed at U. S. Steel Corporation's Fairless Works.

Precipitators for blast furnaces and detarring are old, familiar applications for Research-Cottrell. At the end of 1955, 162 blast furnace and 464 detarring precipitators had been installed by Research-Cottrell, including three recent installations at the Fairless Works.

Scarfing and sintering machine applications are fairly recent developments, however. At present Research-Cottrell has installed two scarfing machine precipitators. Five iron ore sintering machine precipitators are in operation, and one more is under construction.

Research-Cottrell has also developed and installed precipitators for electric furnaces, ferromanganese blast furnaces and iron cupolas. For more information on any of these "steel industry" applications contact your nearest Research-Cottrell representative—or write for Bulletin GB.

Research-Cottrell, Inc.

Main Office and Plant: Bound Brook, N. J.
405 Lexington Ave., New York 17, N.Y. • Grant Building, Pittsburgh 19, Pa.
332 N. La Salle St., Chicago 1, Ill. • 111 Sutter Bldg., San Francisco 4, Cal.

Scarfing Machines

Two precipitators clean scarfing machine gases (95,000 cfm) from a slabbing mill and blooming mill. Collection efficiency is 95%.

Blast Furnace

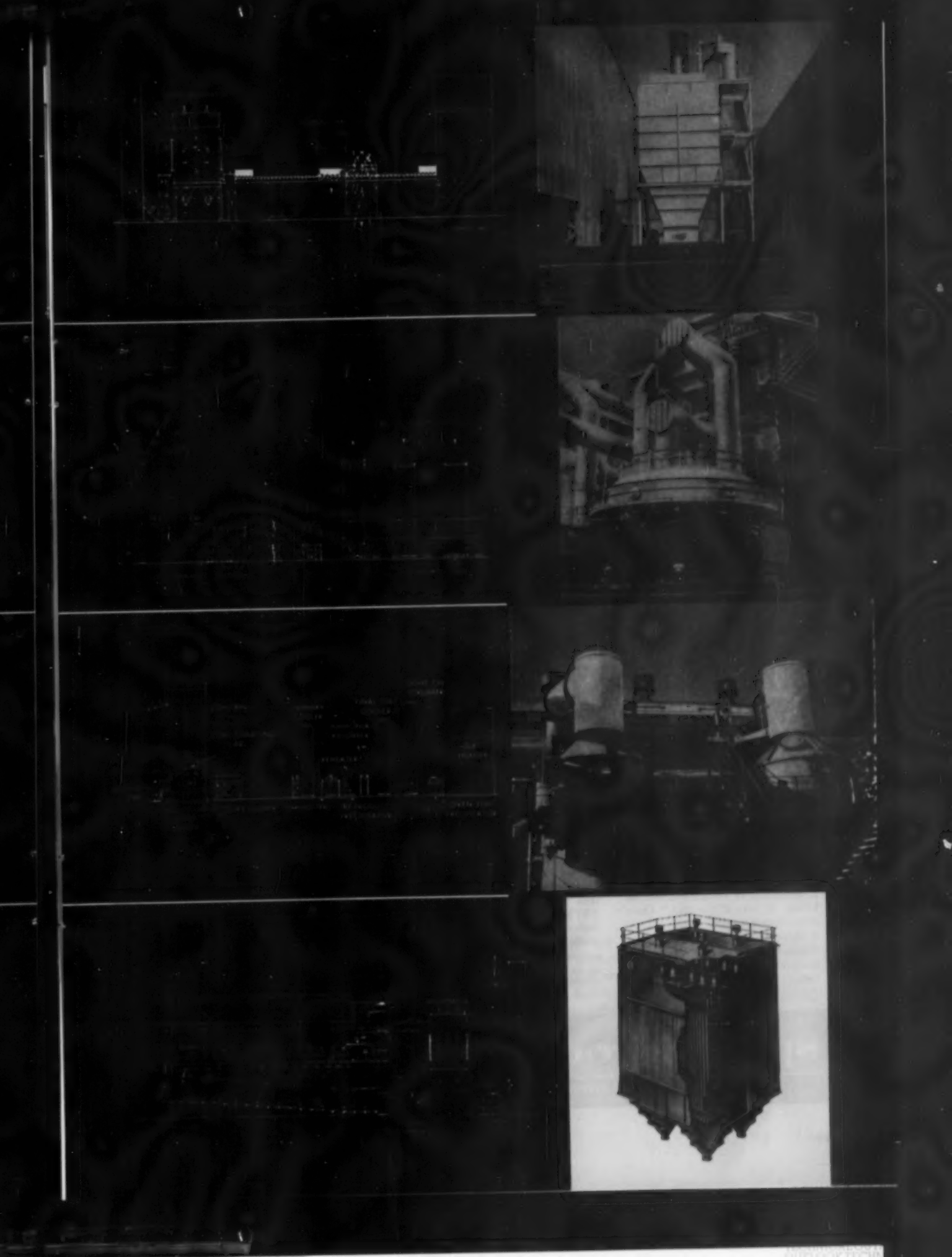
Four precipitators clean gas (330,000 cfm) from two blast furnaces. Efficiency is 95%.

Detarring

Four precipitators clean coke oven gas (62,160 cfm). Collection efficiency is 95%.

Sintering Machines

One precipitator (see cut-away drawing at right) will clean 440,000 cfm of gas from iron ore sintering machine. Collection efficiency of 95% is guaranteed.



Sperry

ultrasonic inspection news

HOW ULTRASONIC TESTING HELPS U. S. STEEL PRODUCE FLAWLESS FORGINGS!

This turbine generator shaft—forged and sonic-tested by U. S. Steel—is part of the first nuclear reactor power plant to be built in the United States. The 60,000 kilowatt power plant will go into operation in 1957.

Here, the shaft is being Reflectoscope-tested while it is still in the lathe. The forging will be sonic-tested a *minimum of 5 times* as it progresses through various stages of manufacturing. At U. S. Steel, turbine and generator rotor forgings are tested at these stages:

1. Preliminary sonic test is run on the rough forgings before machining.
2. Forging is rough-turned to bring it into a "round," then sonic-tested again.
3. After a bore has been drilled through the forging, it gets a complete full-scale sonic inspection.
4. After grain-refining (heat-treatment) another sonic test is made.
5. After finish-machining and stress-relieving, the forging is inspected again as specified by the customer.

All these sonic inspections are usually conducted while the forging is rotating, except for the as-forged test. A carbide tool finish is used to provide a suitable surface for the double-crystal search unit.

This testing for defects before forgings are placed in actual operation enables U. S. Steel to turn out flawless forgings that *exactly* meet ASTM and customer requirements. Reflectoscope inspection saves U. S. Steel man-hours and money... helps assure customer satisfaction! It can do as much for you. Use the handy coupon to ask for full information.

THE SHOW'S ON THE ROAD!

Sperry's new ULTRASONIC CARAVAN is now on a nationwide tour of plants and factories throughout the United States.

The Caravan's compact exhibits will demonstrate every aspect of ultrasonic testing and equipment to management and engineering personnel. You will see all types of Sperry Reflectoscopes, signaling and recording devices—in action... in your own plant... using samples of your own materials or products for testing!

If you are located in one of the nation's larger industrial centers, the ULTRASONIC CARAVAN is probably already scheduled to visit your area. If not, your Sperry Representative will be glad to discuss the possibility of a visit to your plant or area.

To keep posted on latest developments in the profitable use of ultrasonic inspection, send for your copy of our Ultrasonic Inspection News Letter.

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602 Shelter Rock Road
Danbury, Connecticut

☐ Send me detailed Reflectoscope information.

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FIRST IN ULTRASONIC INSPECTION

STEEL
September 10, 1956

Technical Outlook

STRONGER VESSELS— Unfired pressure vessels can be made of aluminum alloy 5086 according to a ruling of the American Society of Mechanical Engineers. The gain: An 18 per cent design advantage over the next highest strength alloy. The alloy, acceptable in both sheet and plate form under the ASME Code, is the highest strength aluminum alloy to be sanctioned for welded construction. Kaiser Aluminum & Chemical Corp., which developed 5086, recommends the use of code-approved 5356 alloy wire or rod in welding.

CARBIDE RUMORS— Several makers of carbide cutting tools are reported to be working on new grades that will give ceramics a run for their money. The new materials are lighter than others in the carbide family, more rugged than ceramics. One guess: Tungsten is absent; titanium takes its place.

GAS BATTERY— Fuel cells which produce electricity from hydrogen and oxygen are next on the agenda at the Parma, O., laboratory of National Carbon Co., a division of Union Carbide & Carbon Corp. Long life features will make them natural candidates for use in marker buoys and remote stations that must operate years without attention.

EXTRUDING TITANIUM— Tests at Battelle Memorial Institute, Columbus, O., show titanium can be cold extruded with uniform deformation and work hardening. Billets 3 in. in diameter and 1½-in. long were forward extruded with reductions of 40, 50 and 60 per cent. A fluorine coating combined with an oil-graphite-molybdenum disulphide lubricant prevents seizing in the die and gives a good surface finish. Extrusion pressures are comparable to those for steel.

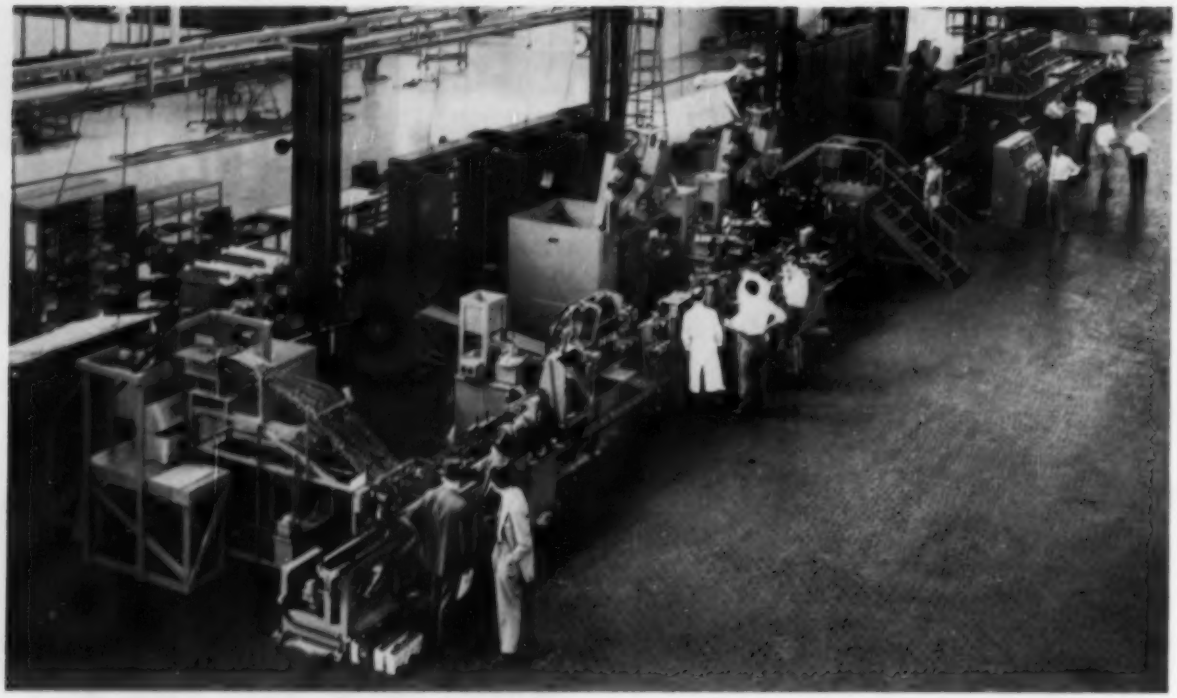
RETARDS FIRE— A new insulating mastic will not run, drip or burn in a 2000°F flame. Insulmastic Corp. of America, Summit, Ill., says its insulation can be troweled or sprayed on metal, wood and fiberboard. It acts as a fire retardant. Plus features: Withstands acid and alkali fumes, is good for rustproofing.

LIGHTWEIGHT ENGINE— Cylinder walls sprayed with steel may be the key to a serviceable aluminum engine for autos. The lining may even eliminate the need for piston rings. The developers, Aluminum Company of America, found the secret: A superthin bond of molybdenum to make the steel stick.

PORTABLE RADIATION— The Newport News Shipbuilding & Drydock Co., Newport News, Va., has a portable isotope radiography machine that can do the job of a 2 million volt x-ray unit. The source is 50 curies of cobalt-60. Built by the Nuclear Systems Division of the Budd Co., Philadelphia, the machine may be used to detect defects in atomic reactor shielding.

GRINDING STRIP— A throwaway abrasive strip that can be used on lightweight aluminum grinding wheels does as good a job as vitreous grinding wheels, states its developer, the Commonwealth Engineering Co., Dayton, O. It eliminates the need for heavy duty arbors and bearings. The abrasive-containing strip is made of heat resistant plastic on a fiber base.

Metalworking Outlook—p. 93 *Market Outlook—p. 207*



Developed at GM's Technical Center, this inline machine puts 73 parts into 400 Oldsmobile cylinder heads every hour. The machine is 137 ft long

Automatic Assembly Is Next

Demands for higher production, better quality and more uniformity make assembly jobs prime targets for automation. Tightened tolerances accentuate the need

EVER SINCE automation started its big push in the 1940s, machining, forming and other processing operations have been the regulars on the team. Assembly, for the most part, has looked on from the sidelines.

Automatic assembly is being groomed for a starring role.

G. R. Fitzgerald, director of General Motors' process development section, eyes it this way: "In the mechanization of manufacturing, one of the greatest areas for potential improvement is assembly. A far greater percentage of this work is done by hand and a greater percentage of labor is involved in this type work than in machining or processing."

Benefits—Four advantages of automation stand out as big reasons for considering automatic assembly: Higher production, better quality, lower costs and upgraded labor.

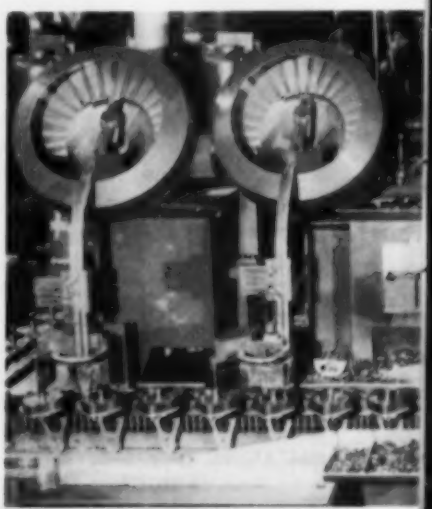
Faster, more continuous output is the most obvious. It's thought of first when someone talks about automation.

As an example of what can be done, General Mills Inc. makes a machine that assembles electronic circuitry. Called the Autofab, it will put together in a minute the same number of assemblies that would take a man a day to build.

Quality — Second, and sometimes even more important than the production boost, the quality of assemblies remains uniformly high . . . as high as the machine is designed and built to produce.

Human error is eliminated. Every assembly is like the one before and the one to follow. Those close to the guided missile program say that their biggest single headache is the great number of rejects traceable to faulty assembly.

Quality also may be increased, thanks to one of the rules for automatic assembly—tolerances on parts fed to the machine must be



Built up from a standard inline index unit, this machine is assembling end bearings at the Anderson, Ind., plant

rigidly held to preclude fouling both the feeding and assembling systems.

Tedium—Assembly machines are at their best on monotonous, repetitive jobs—the kind most susceptible to mistakes when done by hand. By assigning these to the machine, management can shift labor to operations where the versatility of the hand is essential.

Dollars—Finally, automatic assembly, by reducing direct labor, eliminating rejects and getting rid of lost motion, will cut the costs per piece to a minimum.

Big and Little — The assembly doesn't have to be complex to justify automation. A machine made by Bodine Corp., Bridgeport, Conn., turns out 40 dampening-spring assemblies an hour. Equipped with four Syntron vibrating hoppers, the machine inserts a sleeve in the center of a spring seat, drops the spring over the sleeve and seat and caps the assembly with another spring seat. Only four parts are involved.

New Departure Division, GM, uses a modified V&O press to assemble small, low-cost thrust bearings for door hinges. A shell, two rings and the balls are fed from vibrating hoppers to an index table that feeds parts into the press for crimping and forming. It turns out 52 completed bearings a minute.

Integrated with other operations, assembly often is a natural. For example, a new broach made by American Broach & Machine Co., Ann Arbor, Mich., assembles bushings into cover parts and burnishes them in a continuous operation, turning out 400 completed parts an hour.

Entry — If automatic assembly fits your operation, how do you get into it? Do you simply hire someone to come in and build a machine that'll do automatically what's being done by hand? Almost all the experts say, "No." S. K. Georgieff of the Ferguson Machine & Tool Co. Inc., St. Louis, advises: "Learn to walk before you jump."

Begin at Home—The best place to start is with the manual operation. Builders advise prospective customers to make a close study of the operations as they are. Examine all methods of hand assembly and alter them until you're convinced you have the best possible manual method. Build the

Making the Switch

Based on comments made by both makers and users of assembly machines, here are important points to consider when you're looking at automatic assembly for your plant:

Upgrade manual methods until you're convinced you are using the best possible combination of hand techniques.

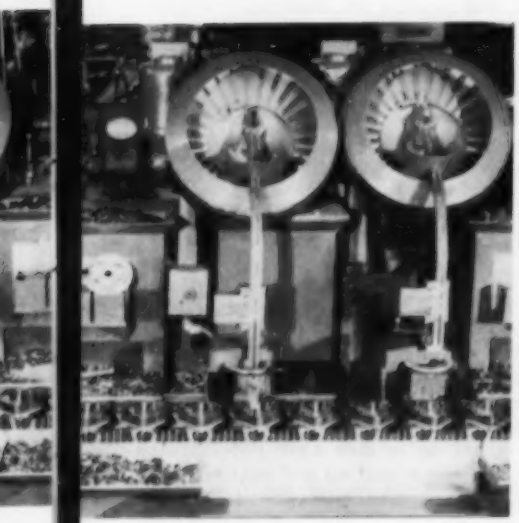
Check design of both parts and assemblies to make sure they can be fed, oriented and assembled automatically. Avoid parts that might jam or tangle in the feed system; see if you can redesign for automation.

Simplify part design where possible. The more work you give a machine, the more trouble it's likely to give.

Use standard machine components, such as rotary tables and in-line index machines. They'll help hold costs down.

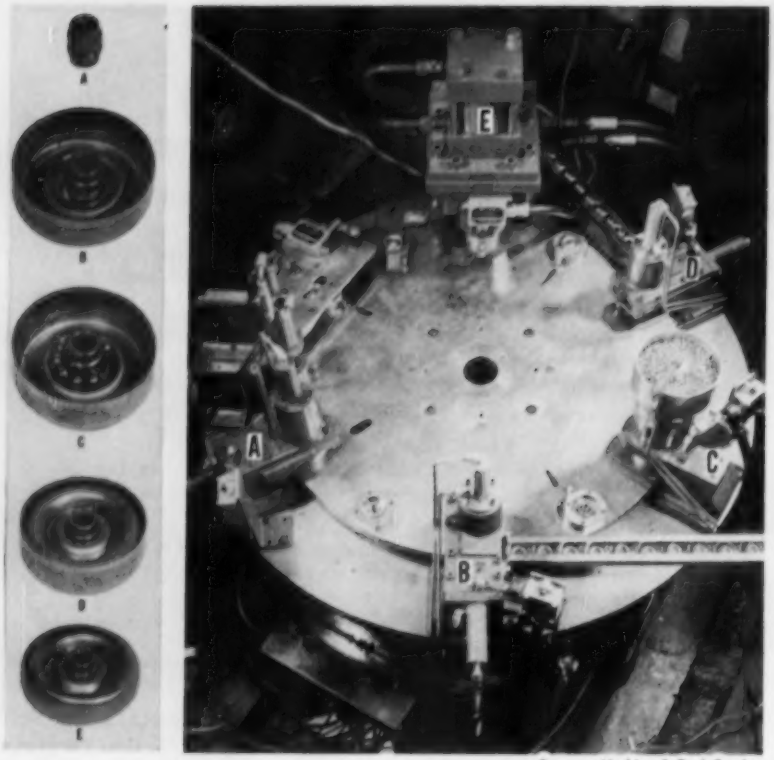
Move in easy stages to the automatic line. Start by having assemblers work at the machine . . . then add automatic stations as it becomes practical.

Make each automatic operation compete with the best hand methods. Sometimes it will pay to leave some operators on the line, automating only part of the sequence.



of Delco-Remy Division, GM. Parts are fed from four commercially available rotary hoppers

Automatic and manual operations can be combined on the same line for most efficient approach. Here, at Plymouth Division, Chrysler Corp., an operator drops in four spark plugs—they're automatically tightened at the next station



Ferguson Machine & Tool Co. Inc.

This rotary table machine assembles 30 skate wheels a minute. In sequence, it: A. Drops an axle sleeve into the fixture. B. Drops the outer web. C. Puts eight 3/16-in. balls into place. D. Places the inner web. E. Hydraulically crimps the outer web over the asesmbly. It then takes the completed wheel off the machine and checks the fixture to make sure it's empty before it goes into the load position

automatic approach on that base.

Experts also warn against jumping too fast on the idea that the whole process should be automated. Each automatic stage, they say, should be competitive with the best hand method for that job.

Even when the job is to be completely automated, or when it is complex, Howard Maynard, president, Snyder Tool & Machine Co., Detroit, recommends that the first project be devoted to engineering and exploration. Not until the guesswork and figuring are out of the way should the method and machine be decided on.

Simplified Start—For the small and medium-sized plant, equipment makers suggest: Buy a standard machine unit such as a rotary table or inline index machine. Move the hand assembly to the machine, and add automatic stations as they're justified.

P. H. Alspach, manager of GE's equipment development laboratory, says his company will automate 20 to 30 per cent of its assembly operations, doing it in easy stages. Assemblers will be moved to indexing machines, and then will gradually be replaced by automatic stations. Less than 5 per cent of GE's current assembly is automated. An exception: The new $7-million motor plant in Schenectady, N. Y., where only two major hand operations are left on a line that builds induction motors.

Danger Signs—Here are some trouble spots to watch for if you're thinking of automatic assembly:

Are the component parts adaptable to hopper feeding? Springs, fragile wires and complicated shapes may tangle in the hoppers, can foul up the feeding mechanism, or may not feed at all.

Are all parts within planned tolerances? Mitchell T. Arcy, vice president, Ace Tool & Machine Co., Detroit, puts it this way: "You have to look out for precision assembly of nonprecision parts."

As for orientation, it's almost always easier to use the outside rather than the inside diameter. One auto maker recently had to add small lugs to the outside diameter of a washer so a key on the inside diameter could be slipped into a keyway on the shaft.

Over-All—Consider also the design of the whole assembly. While authorities feel they can build equipment to assemble almost anything, they point out that simplification (usually by redesign) can save precious dollars.

Electric and electronic wiring circuits, for example, were highly complicated until someone came along with the printed circuit. Assembly of units to the printed circuit now is a relatively simple, inexpensive job.

Standards — Companies concentrating on automatic assembly machines have standardized on many machine components. They make standard bases and drives, alter and tool them to do a specific job.

These standard components also can form the basis for home-designed specials. One big advantage, in addition to savings accrued from buying standard units, is that basic machine parts will have been tried and debugged.

Cost—George H. Kendall, president, Kenhos Corp., Norwalk, Conn., says: "Averages indicate that to automate a hand operation will require an investment equivalent of a year to a year and one-half in wages paid for the hand operation. Heavy equipment processes have a somewhat higher rate for automation processes."

Look for special machine tool builders to develop the assembly field. Ralph E. Cross, whose Cross Co. built the much-publicized Plymouth engine assembly line, says: "Automation for assembly operations is the next big thrust for special machine tool builders." He looks for the assembly machine to take over a substantial part of the order board for many builders that up to now have concentrated on metal-cutting automation.

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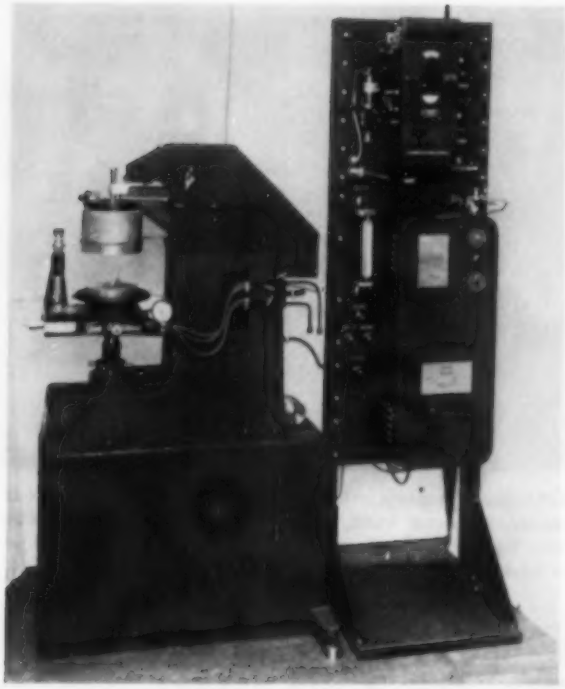
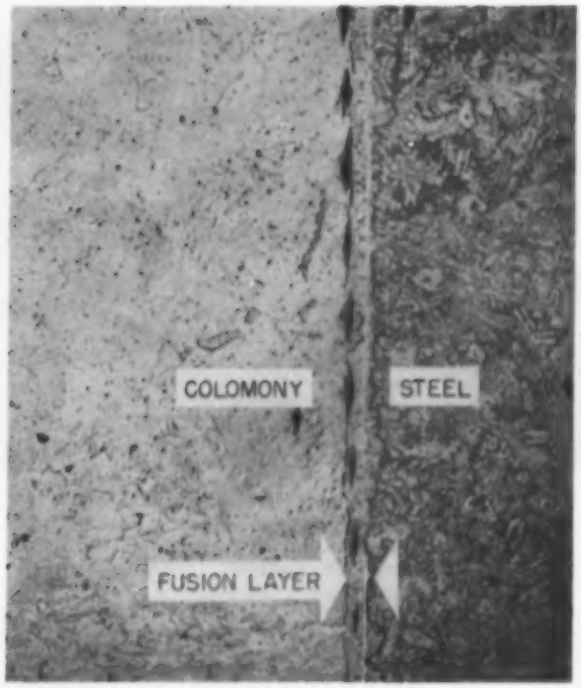


Comstock & Wescott micro hot-hardness testing machine



Test on fusion layer where coating bonds to metal

Hot Hardness Testing to Ten-thousandths

Measuring hot hardness of the microscopic layer where thin coatings bond to base metal takes unusual precision. Here's how Watertown Arsenal laboratory does it

HOW DO YOU go about measuring the hardness of an area 0.0005-in. wide and 1000°F hot? And if you could do it, why would you want to?

The problem becomes important in determining the properties of coatings, in particular the nature and strength of the interface area where coating bonds to the base metal.

It was important, for example, to the Watertown Arsenal laboratory. It needed a micro hot-hardness testing machine that would:

1. Operate at high temperatures with accuracy comparable to commercial machines operating at room temperature.
2. Offer a load range of 10 to 100 grams.
3. Locate within 0.0002-in. of a predetermined point.
4. Protect the specimen from oxidation.

Done—Comstock & Wescott Inc. (Cambridge, Mass.) engineers found a way to fulfill each of these requirements. The tester they devised is at work measuring the hardness of metallic coating cross sections.

Basically, the instrument is a modified Knoop indenter. To it have been added a furnace for heating the specimen during testing, microscope and micrometer stages for locating testing points on the specimen, and equipment for temperature and protective atmosphere control.

Pinpointing—Specimens to be examined are machined and polished in a conventional manner, with the exception of locating notches. These are ground in at opposite ends of the specimen.

Quartz centering pins, weight loaded to compensate for thermal expansion, grip the specimen by these notches in the tester.

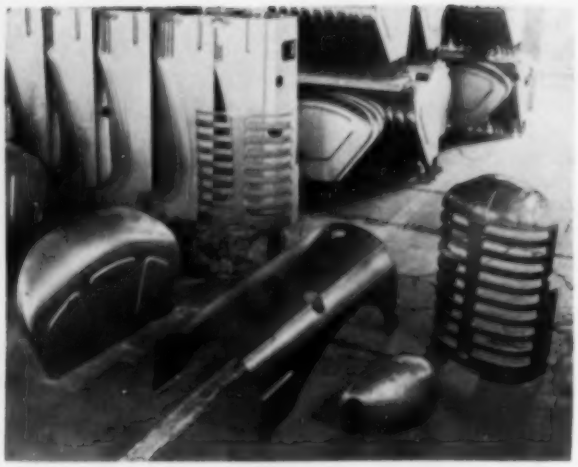
A microscope equipped with a mechanical stage is used to pick out the exact spots to be tested. Then the specimen is moved to a mechanical stage in the tester which duplicates the microscope stage setting.

Heat—The furnace, which surrounds the specimen in the tester, is built in two halves. Both are electrically heated, with water cooled baffles to minimize heat transfer to the rest of the machine. Testing may be done in the 500 to 1250°F range.

The lower half of the furnace is constructed mostly of fused quartz. It may be raised and lowered to admit the specimen. The upper half is made of stainless steel.

A dry hydrogen atmosphere is maintained in the furnace during testing. Slow leakage of the gas through the opening where the indenter rod enters acts as a bearing to keep the furnace from exerting pressure on the rod.

1—Gasoline tank stampings (foreground) and other hydraulic press stampings. Flange of part at upper right will be trimmed and the stamping sheared into two duplicate pieces



2—Larger stampings. In foreground, left to right, are a fender, a tractor hood, a grille top and assembled grille with top spotwelded in place. Another type fender is in background

Hydraulic Stamp of Quality

A maker of agricultural equipment finds that hydraulic presses are good performers in forming, trimming and piercing operations, as well as deep drawing

By ROBERT JOHNSON
Works Manager
Massey-Harris-Ferguson Inc.
Racine, Wis.

LARGE STAMPINGS are becoming increasingly important in the production of many products. Massey-Harris-Ferguson Inc., Racine, Wis., finds hydraulic presses can turn out the high quality stampings necessary for its tractors and other agricultural equipment.

Hydraulics are good performers in forming, trimming and piercing, as well as deep drawing jobs. The company recently added a third H-P-M, 400-ton, hydraulic, triple-acting press to its stamping line.

Versatile—Several of the stampings produced on the three presses are shown in photos 1 and 2. In several cases, especially for parts that are not symmetrical about the draw axis, the stamping is drawn "double" and sheared in half to form two duplicate stampings.

This is true of the grille tops produced in the setup in photo 3. The stamping is drawn to a depth of 9½-in., then sheared into two duplicate parts. Each has a hole pierced above the neck of the radiator it covers, as shown at lower right in photo 2. Beside this half in the photo is a grille, formed and pierced in the same presses, then spotwelded to the top stamping.

Feather Touch—Hydraulic presses are well adapted for deep drawing because both draw ring pressure and the rate of draw can be adjusted to do the job without rupturing the stamping and without significant variation in section thickness.

It is possible to use the third action, the cushion below the bed, to perform an embossing operation, as in tractor fenders. Embossing helps stiffen large areas.

Smooth—The fender stampings are made from 20-gage, cold-rolled, drawing-quality steel. Draws are about 4 in. deep. Blanks are precut to shape, so that only a narrow flange remains to be trimmed from the contour of the drawn part. The drawn metal is free of wrinkles and requires little or no dressing before painting.

In some cases, the presses perform three successive operations on the same stamping, as for the tractor hood at center in photo 2. In other instances, only two presses are needed to complete the stamping. Because of the large bed area (60 x 96 in.), large blanks can be used.

Setup—Pressure can be varied

3—Removing a deeply drawn stamping from the die. When sheared in half, each part becomes a tractor grille top

4—Ten-gage blanks, already trimmed and pierced, are formed into fender brackets in a die that first bends the piece to approximate contour and then forms flanges along each side

to suit the job. Usually, fast traverse at light pressure is used up to the point where the punch contacts the work. Then the rate of traverse is reduced and pressure increased to perform the draw or other work.

Because the punch and draw ring are controlled by independent actions, each is set to perform its function at the proper point and with the preset pressure. Once optimum pressures are determined and recorded, setups for re-runs are done quickly.

Fuel Tanks — Among stampings produced in large volume from terne plate are Ferguson fuel tanks. Some are 14 gage, some 18 gage. They are drawn in two halves with flat contour flanges that are later seam welded.

Often, one or both halves have varying depth. Beads on the parting face of the die help to control metal flow during the draw in such a way that varying depths are produced without wrinkles or thinning out when the draw is severe.

Triple Action—Some draws on these halves are 10 in. deep; others are 9 in. In this setup, the main ram operates on the draw ring and the inner ram applies only a 140-ton pressure in making the draw. Embossing and ejection are done by the cushion below the bed.

For such drawing, a special draw compound is applied to the blank. The press operator uses a hand roller that is dipped into a tub of compound. This provides a uniform coating and is faster than using a brush.

Trimming — When the draw is completed, the stamping is removed and placed in a chute down which it slides to the next press. There, the stamping is trimmed around the contour. This requires a pressure of only 140 tons.

The trim die is placed to the right of center to provide space for a piercing die near the front left corner of the bed. After the flange has been trimmed, the stamping is placed over the piercing die.

Before the press is closed, a stamping is placed in each die. At each working stroke, one stamping is trimmed, and one is pierced. The piercing punch is operated by a ram lowered to suit the die.

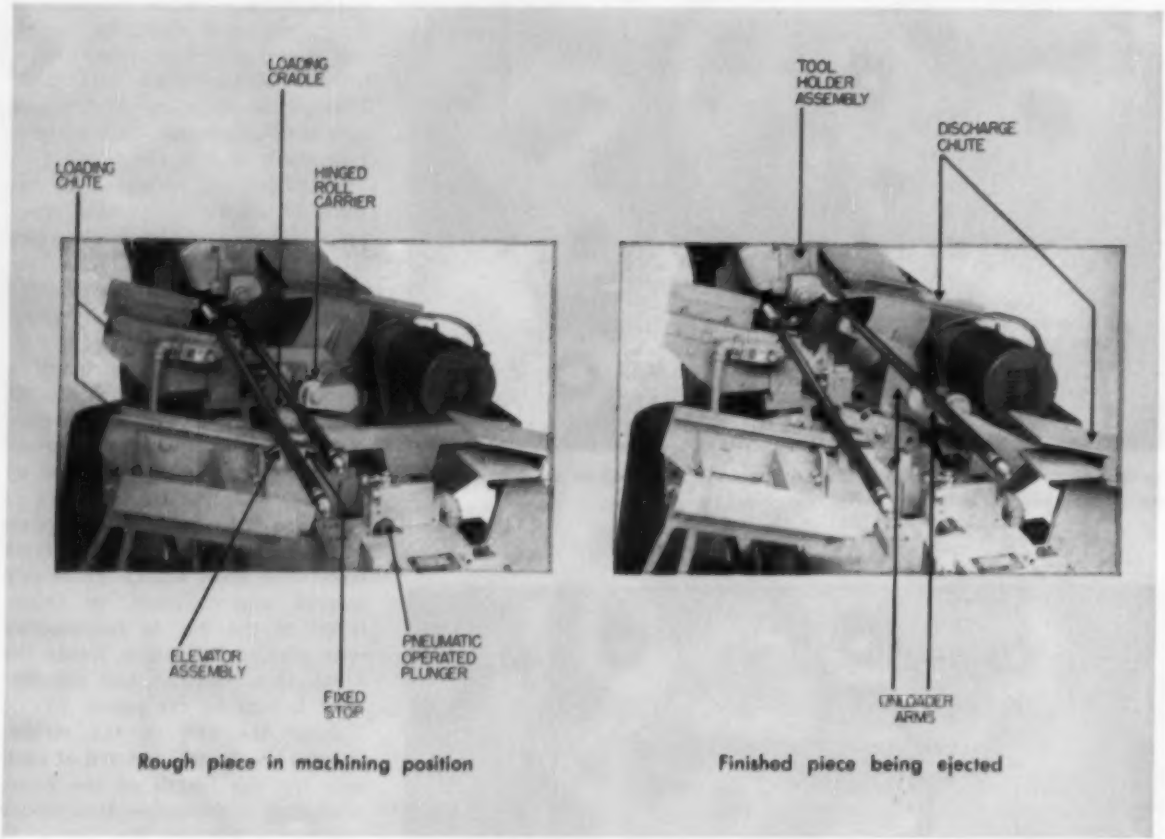
Flange Forming—Photo 4 shows the third press being used to form cold-rolled steel blanks previously pierced and trimmed to shape. Stops in the die, in combination with pins in the punch, locate the blank both endwise and sidewise as it is bent by the punch.

Near the end of the stroke, flanges are formed upward at each side for the length of the piece, producing a channel-section fender bracket. Because the piece is curved and of heavy section, flange forming requires a 380-ton pressure. This causes some flow of metal in the flanges, but they are prevented from wrinkling because they are confined between the punch and side walls of the die.

No trimming is needed after forming because the blank is so shaped that flanges are of the required tapering height throughout their length. A finished stamping from the die appears on the bed of the press and in the background of photo 1.

Big Press — One of the largest stampings produced is the hood for a Massey-Harris tractor, shown in the center foreground of photo 2. This is done in three operations and requires a press with a long ram travel.

Somewhat the same is true of the grille stamping (right in photo 2). The grille requires the piercing of 18 openings (all of which are flanged inwardly around their contours), the piercing of several other holes and forming the piece as a whole to a roughly semicylindrical shape.



Rough piece in machining position

Finished piece being ejected

Standard Machine Goes Special

HOW TO remove welding flash from a worm shaft assembly on a high production basis was the problem of an automotive manufacturer.

The solution was to equip an automatic lathe, made by Seneca Falls Machine Co., Seneca Falls, N. Y., with automatic handling equipment. Substantial savings in initial cost and lead time were realized. Production is 275 pieces an hour.

How It Works—Two views of the handling equipment are shown above. A conveyor carries the hot parts from the welding machine to the lathe. Parts flow down the loading chute by gravity to the fixed stop, which is the loading position.

After a part has been finish turned, the spindle stops, the hinged, steady-rest roll carrier retracts, the collet chuck opens and a spring loaded ejector rod ejects the finished piece from the collet. The finished piece is deposited on the unloader arms, which immediately swing it into the discharge chute and return to the receiving position.

Lathe Operation—At this point, an elevator assembly raises a rough piece over the loading chute stop into the loading cradle. This cradle remains in the raised position until the part is injected into the collet chuck by the pneumatically operated plunger.

The collet chuck closes, the elevator assembly retracts, the hinged, steady-rest roll carrier automatically closes, the headstock spindle clutch engages, the tools on the overhead slide advance to the cutting position and the flash is removed and burnished. Tools then retract and a new cycle begins.

Tool Layout—Parts are held and driven by a collet chuck. An insert-type carbide tool removes the hot flash. A burnishing roll is used to smooth and evenly match the junction of the welded parts.

The loading, machining and unloading operations are automatic; but pushbutton controls are installed for the manual operation of each movement.

The loading cycle cannot get out of time since the automatic sequence is controlled by a system in which each movement is initiated by the completion of the preceding movement.

REVERE COPPER EXTRUSION shown attached to skirtboard before full assembly, which you can see below in exploded view. A matching bar, similar to the one shown is part of the "packaged" HANCO unit and is fastened to the opposite side of the screen. Units, in turn, are installed on the various types of Vibrating Screens made by HEWITT-ROBINS INC., Passaic, N. J., and are known as the HEWITT-ROBINS HANNON Electric Screen Heaters.

CLOSE-UP showing end of the Revere Copper Extrusion.

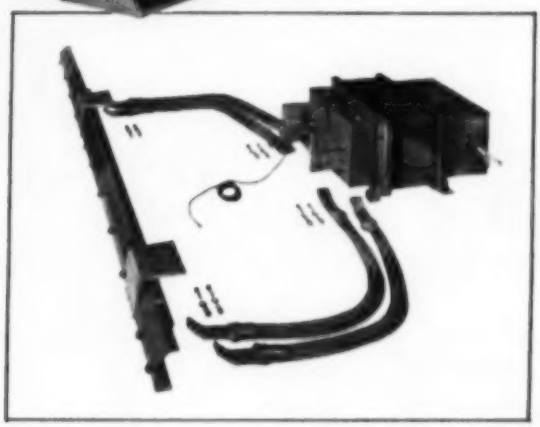
Revere Copper Extruded Shape

in Hanco Electric Screen Heater

out-performs

former copper casting

on 4 counts



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F. R. HANNON & SONS, Canton, Ohio

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Here's the Score!

COPPER EXTRUDED SHAPE	COPPER CASTING
1—12 foot mill lengths offer flexibility, eliminating both welds and scrap	1—60" casting required additional welded joints
2—Shape offers lack of porosity	2—Casting gave porosity problem
3—Shape straightness is superior to casting, giving better electrical contact	3—Bow in casting presented difficulty when fastening screen firmly to contact
4—Higher cost per foot, but cheaper over-all installation	4—Initial cost was lower, but additional welds and scrap resulted in higher final cost, and an inferior finished product

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Continuous welding steel pipe. Hot skelp emerges from the furnace (left), is formed and welded (center) and cut into lengths by a flying hot saw (right)

Quality Control in a Pipe Mill

Simple statistical methods help Fontana, Calif., plant of Kaiser Steel Corp. increase its production of good pipe. Added feature: Trouble spots are pinpointed

By JAMES A. CURRY
Kaiser Steel Corp.
Fontana, Calif.

YOU can reduce rejects and reprocessing in a pipe mill by using easy-to-understand statistical quality controls. As a bonus, the data will help you pin down other causes of trouble and suggest solutions.

Such methods have increased the amount of good pipe produced by the Fontana, Calif., plant of the Kaiser Steel Corp. The electric resistance and continuous weld methods are used. Prior to controls, prime (acceptable) pipe varied between 65 and 70 per cent of the total. Today, it sometimes runs 90 per cent.

The Facts—Cold, flat skelp is made into pipe by the electric resistance method. Skelp is passed through a roller leveler. A steel shot blast cleans the edges to insure good electrical contact and welding surfaces. Rotary shears trim both edges to control width.

After trimming, the skelp is formed into an open tube. Revolving electrode discs hold the steel close to the edges, producing the weld. The extruded flash is removed at once by stationary cutters.

Welded pipe passes through several roll stands which reduce the diameter. The final pass insures straightness.

Each length of pipe is visually and magnetically inspected. A crush test follows, and the pipe ends are cut and beveled. In a hydrostatic tester, the pipe is struck with a pneumatic hammer and again checked for defects.

Continuous Weld—To prepare skelp for continuous welding, it is rolled into coils, then fed into a roller leveler. The end of one coil is buttwelded to the next.

The skelp is drawn through a

(*Please turn to page* 150)

DESIGNERS and BUILDERS of Complete STEEL PLANTS

MESTA

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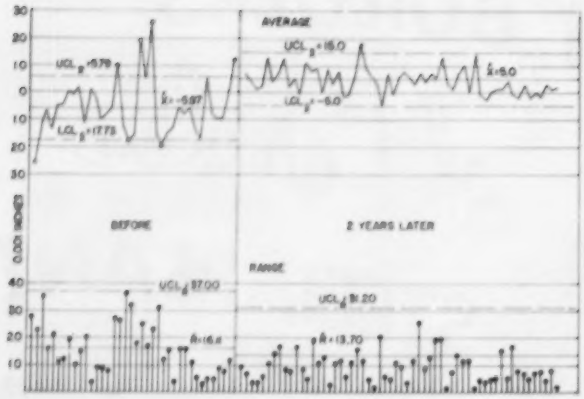
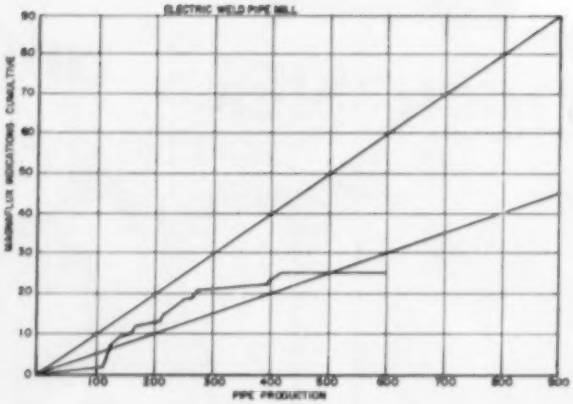
MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA



Establishing chart control of flash depth: Before and after. Micrometer measurements are made at the weld and just outside the cutting areas



The cumulative defects chart based on the Beta function mentioned in the text. This chart showed Kaiser the correlation between electrode trimming and defects

QUALITY CONTROL . . .

gas fired furnace in 30 seconds.

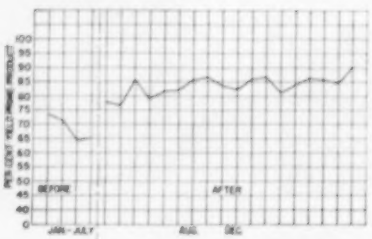
At the exit, air jets increase the skelp temperature 100 to 200° F. It then passes through forming and welding rolls.

A flying hot saw cuts continuous pipe into 21-ft lengths. After final sizing, scale is removed. When cool, the pipe is straightened and inspected.

Start — A preliminary look at quality showed us that nearly half the downgraded pipe came from the crush test. Samples must withstand deflection at the weld of one-third the pipe diameter.

Process analysis started with $\bar{X}$ & R charts. A close study of these showed that out-of-control production was tied in with depth of cut of the inside weld flash. Crush deflection decreased 0.55 per cent for each 0.001-in. of undercutting.

Flash cutting showed a normal variation of 0.045-in. Specifications call for retaining 0.032-in. inside. Solution: The flash cutter was changed so that it would hold 0.020-in.



The yield of prime product increases when you install statistical quality control methods. Here is Kaiser's history

Large diameter pipe can be butt welded in equipment like this. A 40-ft length is shown being welded in a single cycle. Flash is trimmed immediately afterward

To control flash cutting, an average and range chart was installed. Measurements are taken at the weld and just outside of the cutting areas on subgroups of four consecutive pieces and the readings plotted. Control charts help the head welder and mill supervision in eliminating out-of-control performance.

Magnetic Test — Kaiser Magnafluxes all electrically welded pipe. A weld zone void is cause for rejection.

At first, we had little information about weld voids. It was not a controlled process. We discarded the idea of "P" chart control. "C" charts based on Poisson were not useful because it is difficult to count individual defects in a length of pipe.

We now use a cumulative defect chart. Significant changes in the rate of production of Magnaflux defects are determined as a function of the distribution of the in-

(*Please turn to page* 152)

another DRAVO project:
10 MILE TUNNEL UNDER PITTSBURGH

Dravo has started work on a vital part of Allegheny County Sanitary Authority's new $80 million sewage system program. The job: to build a 10 mile long tunnel through rock at an average depth of 100 feet below the city. Called the "main interceptor line," it varies from 4 feet to 10½ feet in diameter. The tunnel will receive sewage through fifty-eight down shafts and carry it to a new sewage treatment plant.

Construction projects in and around water are routine for Dravo. Now underway are piers for a multi-million dollar bridge in New Orleans; a large harbor for ore boats on Lake Superior; docks for industries on the inland rivers. Some of the other products and services Dravo has provided business and industry for more than 60 years are shown below. DRAVO CORPORATION, PITTSBURGH 25, PENNSYLVANIA.

DRAVO
CORPORATION

Blast furnace blowers • boiler & power plants • bridge sub-structures • cab conditioners • docks & unloaders • dredging • fabricated piping

foundations • gantry & floating cranes • gas & oil pumping stations • locks and dams • ore & coal bridges • process equipment • pumphouses & intakes

river sand and gravel • sintering plants • slopes, shafts, tunnels • space heaters • steel grating • towboats, barges, river transportation

complete Beta function at 95 per cent confidence limits. (A good reference is Frank E. Satterwaite's article "A Sensitive and Flexible Control of the Percentage Defective," *Industrial Quality Control*, Vol. 9, No. 2, September, 1952.)

Mill operators have found that the cumulative defect chart can be improved by changes in mill setup. For example, when they compared the chart variations with electrode trimmings, they found that electrode pressure had an effect. Trimming the electrode requires stopping the mill, raising the electrode, trimming and then lowering the electrode. Some method of readjusting the electrode to the same pressure was needed. The answer: Strain gage equipment. Weld zone voids today are well under 10 per cent.

Newer — The statistical control program is not so far advanced in the continuous weld pipe mill. Steel pipe (as sold) is accepted or rejected on piece rather than lot quality. We aim at process levels rather than inspection sampling plans.

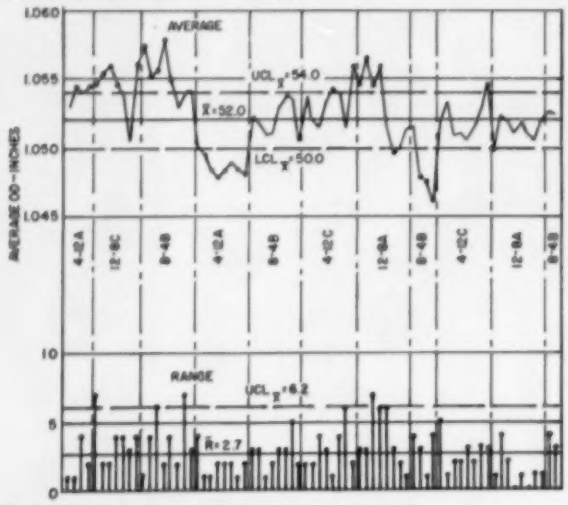
Statistical charts control these characteristics: Average outside diameter, out of roundness, forming and weld defects, straightener performance and threader adjustment. Outside diameter and out of roundness are plotted on regular $\bar{X}$ and R charts. Fluctuation in outside diameter affects the straighteners. Straighteners on the tight side produce too many damaged ends and spiral rings. Straighteners set too loosely won't produce straight pipe. Out of roundness or ovality in excess of 0.010 to 0.012-in. causes a great number of flat threads.

Sampling—Kaiser used 100 per cent inspection at a separation bench after the straightening operation. This culled the more obvious defects to avoid further processing costs. Disadvantages: It was expensive and impeded the steady flow of pipe to the finishing operations. (Inspection usually lagged from three to six turns behind the mill operation.) Information gained could not be used to control mill or straightener

(*Please turn to page* 156)

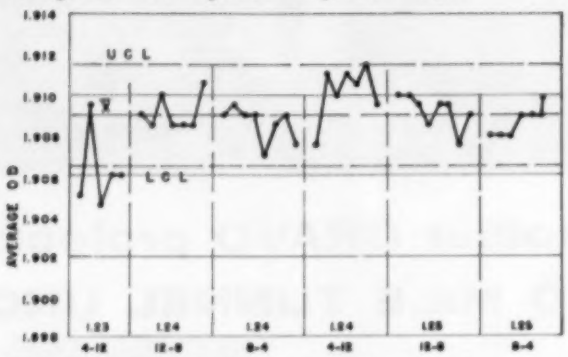
More effect with statistical methods: With these guides, supervisors and operators can make scientific adjustments and see the effects more quickly

Out of Roundness—1 in. pipe



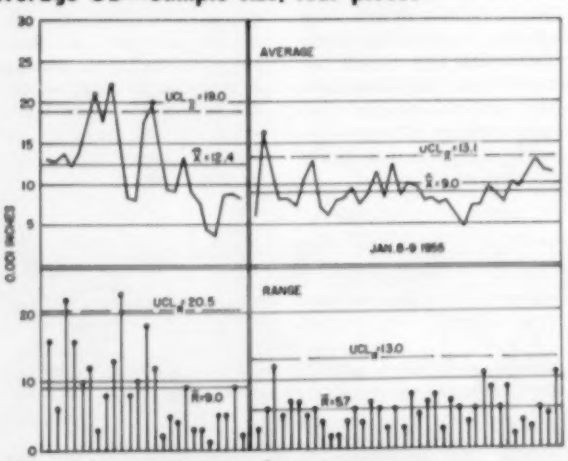
Typical fluctuation in OD prior to control

Average OD—Four-piece sample averages



Out of roundness has been materially reduced

Average OD—Sample size, four pieces



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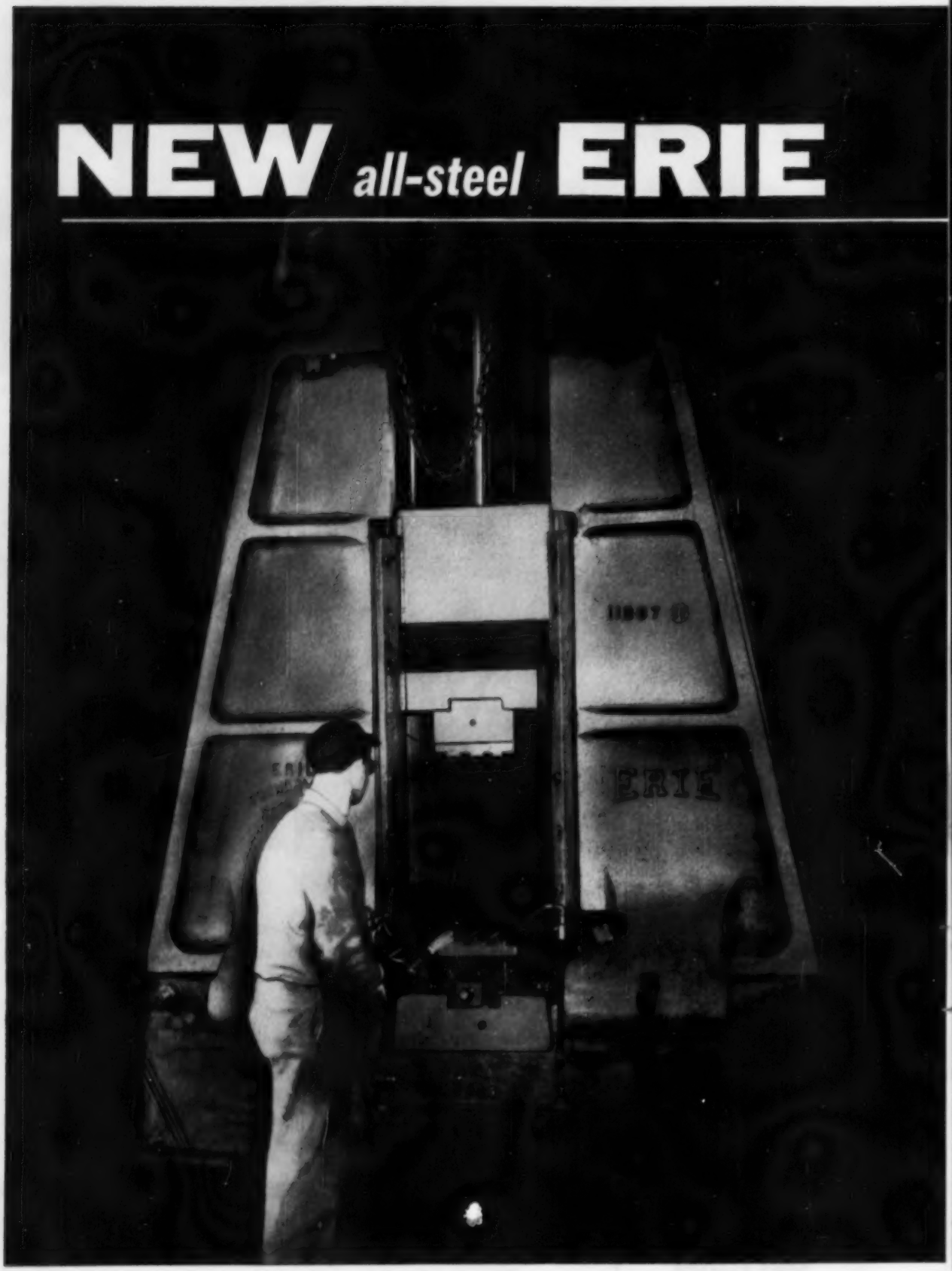

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New design piston-lift gravity drop hammer with

New variable stroke control

More guiding surface for closer-tolerance forgings

Safety-streamlined, economical all steel construction

Experienced hammer operators will take quickly to the definite working advantages of this new Erie Rigidrop. It is a brand new concept in a simple-to-operate all-steel production hammer—striking more blows per minute, more easily, and with finer control than ever before realized. Certain shops will find this the most economical hammer they can use in their operations.

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Now available in sizes 1500 thru 5000 lbs., inclusive

40% more guiding surface—New Erie guide arrangement provides more accurate guiding of ram and continued maintenance of die adjustment.

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Safety designed throughout—No loose linkage, no overhanging parts on the front of the Rigidrop. An air cushion head provides added protection if the hammer is overstroked.

Built-in inching mechanism—For easy die setups.

Better clamping system—Clamp faces are directly opposite one another to give positive clamping action without bending the rod.

Minimum down time—Never any board replacements.

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How much more will alloy materials cost? Actually, on small parts, fabrication, finishing and other manufacturing costs will more than likely far overshadow material cost. You will find that the extra cost of using alloys will be insignificant compared with the benefits in longer service life, lower maintenance costs and fewer customer complaints.

For informative technical data on our alloys . . . and for some good ideas . . .

SEND TODAY FOR OUR NICKEL ALLOY AND STAINLESS STEEL DESIGN HANDBOOKS.

ALLOY METAL WIRE DIVISION

HKP H. K. PORTER COMPANY, INC.
Prospect Park, Pennsylvania

QUALITY CONTROL . . .

operation. Many good runs of pipe wasted the inspector's time.

A sampling plan is a satisfactory substitute. We decided on an outgoing quality level of 1½-per cent for forming, welding and crooked pipe defects. Periodic samples from current production are inspected immediately. Good lots by-pass the 100 per cent inspection bench.

As each sample is inspected, the information is taken to the straightener operator and the mill foreman. They adjust production machinery on the basis of this information. Results: They reduced straightener re-runs 90 per cent.

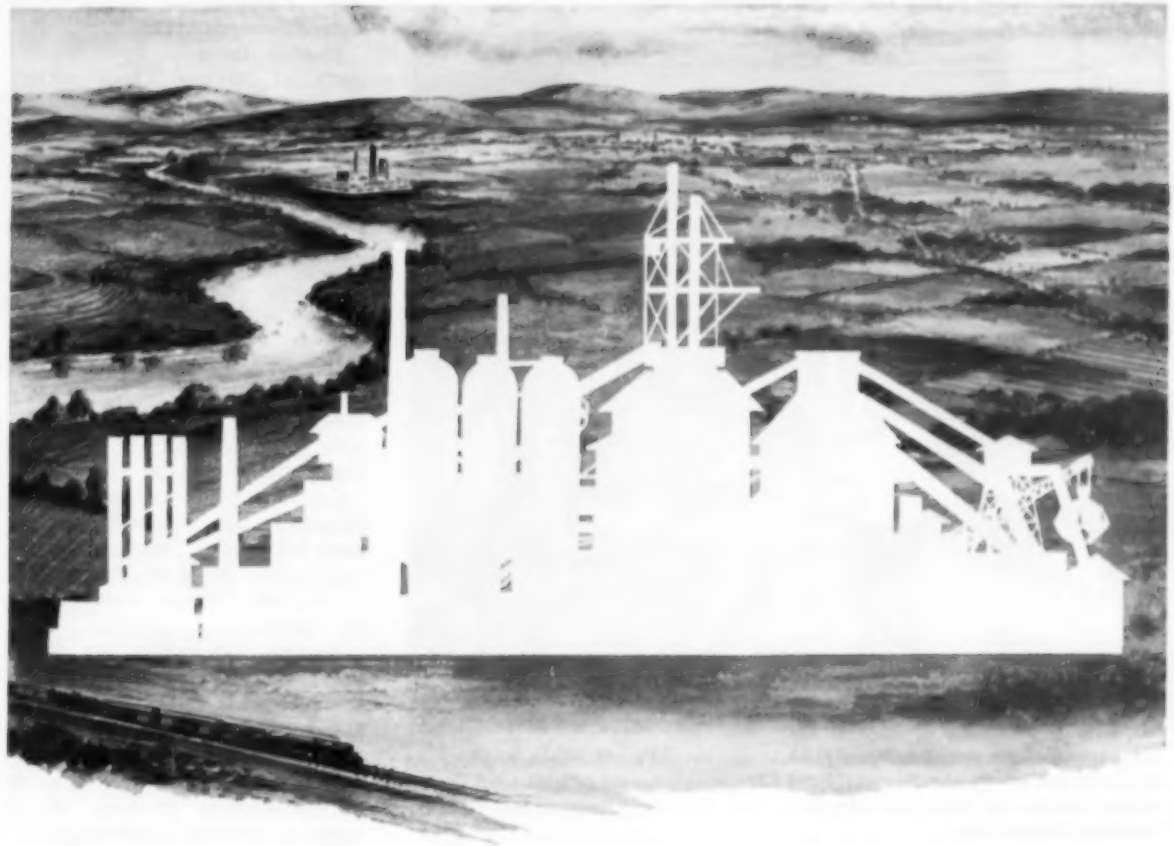
Threaders—We used to have a high percentage of pipe rejects because of poor threads. Cutting and re-threading costs were high. Finished yield was low, and the amount of random lengths was increased.

About half the rejects are caused by the condition of the pipe, the other half by the threading equipment. Of threader rejects, flat threads account for more than half the total. There are three main causes of flat threads: 1. Hooked or bent pipe. 2. Out-of-round pipe. 3. Improper adjustments of the threaders. Improper adjustment was isolated to improper centering of the clamping chucks.

Our inspection method divides the pipe into four quadrants. The threader operator marks the pipe with a piece of chalk on ten successive pieces while they are being threaded. The dieman inspects the threads on each piece and locates the quadrant in which they occur. After ten pieces have been inspected, a simplified application of the Chi-square test is applied to check randomness. If the sample is not 95 per cent probable, an additional sample of ten pieces is marked and inspected.

This method of controlling threader adjustments is most effective. On some selected sizes where most defects occur, the plan has helped mill operators reduce flat threads and rejects 87 per cent.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*



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In the Land of Plenty you can build a steel mill virtually on top of almost unlimited supplies of the world's finest Bituminous Coal and high-calcium limestone. And you can avail yourself of short-haul advantages in transporting ore from the strategically located Port of Norfolk.

The water needed for steel production, on any logically conceivable scale, is available here, too.

Recent scientific studies have revealed some startling facts about the Land of Plenty in regard to its advantages for the steel industry. We invite you to contact our plant location specialists for detailed information, which will be furnished in confidence and without obligation.

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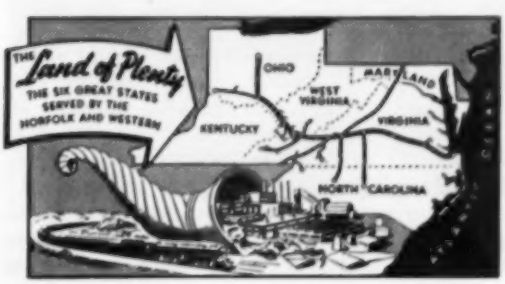
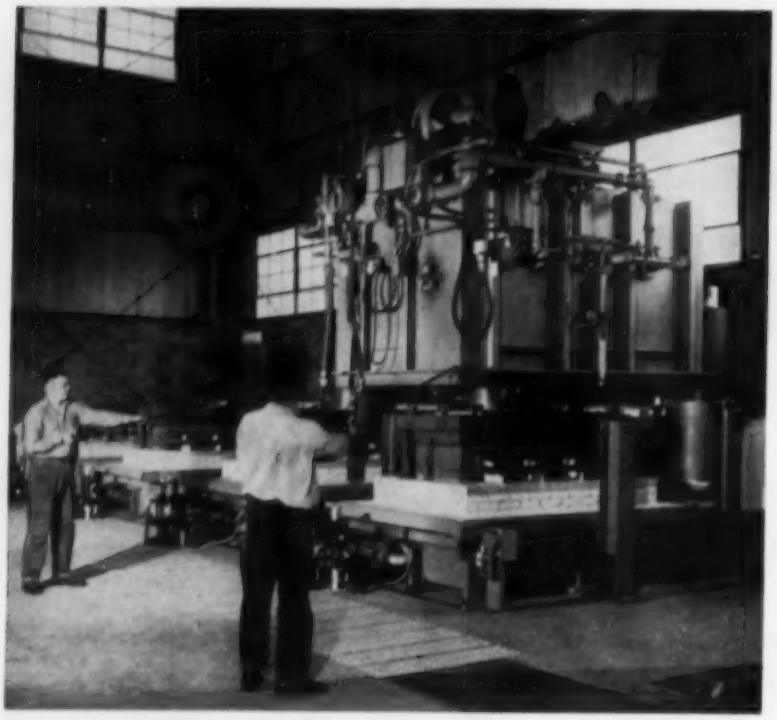
ROANOKE, VIRGINIA



Norfolk and Western RAILWAY

No. 6, Part II, in STEEL's Modern Brazing Series



Brazing plate-fin heat exchangers for high temperature gas-to-gas applications in dissociated ammonia with nickel-base filler metal. Assembly is in sand sealed rectangular Inconel retort on refractory base. Gas fired heating bell is being lowered into position

How To Braze Stainless

Although stringent controls are needed in various steps of processing brazed stainless assemblies, techniques have proved practical in large-scale production

By H. M. WEBBER
Industrial Heating Department
General Electric Co.
Shelbyville, Ind.

EACH brazing application deserves individual study to determine the best means of heating, cooling and atmospheric protection.

Size, weight, configuration, number of joints, type of base metal, type of filler metal and its melting point are important factors.

Heating—If the part diameter is small and the area to be brazed a small portion of the total, or if annealing by over-all heating is objectionable, localized heating such as induction brazing might be the best choice.

If the assembly is large, the shape is complex, or there are multiple joints to be bonded, furnace heating might be better.

Retorts—In induction brazing, the retorts for heating and cooling usually are glass bell jars or quartz tubes. In furnace brazing, retorts of heat resisting alloy or mild steel are used in batch-type units, and muffles of heat resisting alloy or ceramics in continuous or semi-continuous types.

Electric furnaces have heating units of various types—nickel-chromium ribbon or rod for temperatures up to about 2200°F, silicon carbide bars up to about 2500°F and molybdenum rod or wire up to about 3100°F.

Furnaces—Batch-type units for brazing stainless include the box type with in-and-out retorts or built-in muffles, and the pit, bell, bell-car, elevator and car types with retorts. Semicontinuous furnaces are usually of the manual pusher type with muffle. Continuous furnaces generally are of the hump mesh-belt type with muffle.

Lightweight assemblies can be brazed in box, manual-pusher or mesh-belt types; medium weight ones in the pit type; heavy ones in the bell, bell-car, elevator and car types.

Retorts and muffles are necessary for bright brazing stainless to avoid contamination of the dry atmosphere by water vapor or air from the furnace brickwork. Reaction of hydrogen with iron oxide in refractories produces water vapor at elevated temperatures.

Cycles

Stainless steels have a tendency to oxidize when heated in dry hydrogen. A soaking period at a temperature below the melting point of the filler metal is sometimes necessary to reduce these oxides. When the filler metal melts on an oxidized surface, it will run off or ball up and not braze the joints.

The surfaces of the work, fixtures, load supports and retort lining must be oxide-free and well-reduced before going through the melting range. Whether a reduction period is necessary can be determined best by checking dew point of outflowing atmosphere gas.

Temperatures—A typical reducing temperature for brazing with nickel-chromium-silicon-boron alloys, which have a solidus of 1850°F, is 1800°F; when brazing with copper, 1900°F is common.

In some cases, you can heat assemblies to brazing temperature without a reducing period; in

others, you may need to stop from 20 minutes to 3 hours.

The reducing period also allows the heat to soak through massive loads. It makes a good springboard for restarting the cycle to quickly heat through the wide melting range of certain filler metals.

Range—In a test to determine the oxidation range of type 410 stainless in dissociated ammonia, using a hump mesh-belt furnace with an Inconel muffle, samples were put through at temperature steps in intervals of 50°F.

Up to 1400°F, and at 1700°F and above, followed by cooling in the same atmosphere, the samples came out bright. The higher the temperature, the brighter the surfaces. Those treated at 1450 through 1650°F were discolored by oxidation.

Type 347—In another series of tests in a tube-type furnace with in-and-out steel retorts, type 347 stainless showed discoloration between 1290 and 1560°F. The oxide reduced slowly at 1560°F and more rapidly at higher temperatures.

Another user states that 1750°F is the critical temperature at which small variations of temperature, dew point or time can "make or break" brightness. The oxidation range seems to vary with each type stainless alloy, as well as type of furnace, type and purity of protective atmosphere and time-temperature cycle.

Rule—The effectiveness of a hydrogen or dissociated ammonia atmosphere (with a given dew point) in preventing oxidation or reducing oxides depends primarily on: 1. What oxides are involved. 2. At what temperature the reactions are being considered.

Other Factors—After the filler metal has melted, other factors must be considered. The time at brazing temperature generally is kept as short as possible to minimize diffusion of filler metal into the base metal.

In bell-type furnaces, with copper filler metal, the heat usually is cut off and the load allowed to furnace cool to 1900-1650°F, at which temperature the heating bell is lifted and transferred to another base. The bell cools 200 to 300°F in the transfer.

The hot load cools under its retort in the room; or, more commonly, a cooling bell is placed over it to accelerate the cycle and improve comfort and safety.

Fast Cool—If the filler metal is of the high-nickel AMS 4775 type, furnace cooling is sometimes considered too slow to minimize diffusion adequately. Fastest cooling is obtained by lifting the heating bell off at brazing temperature, and cooling the hot load in the room or under a cooling bell.

In gas fired furnaces, some users shut off the fuel gas at the end of the brazing cycle and allow the combustion air to continue flowing to accelerate the furnace cooling cycle to 1800-1400°F, at which point the transfer is made.

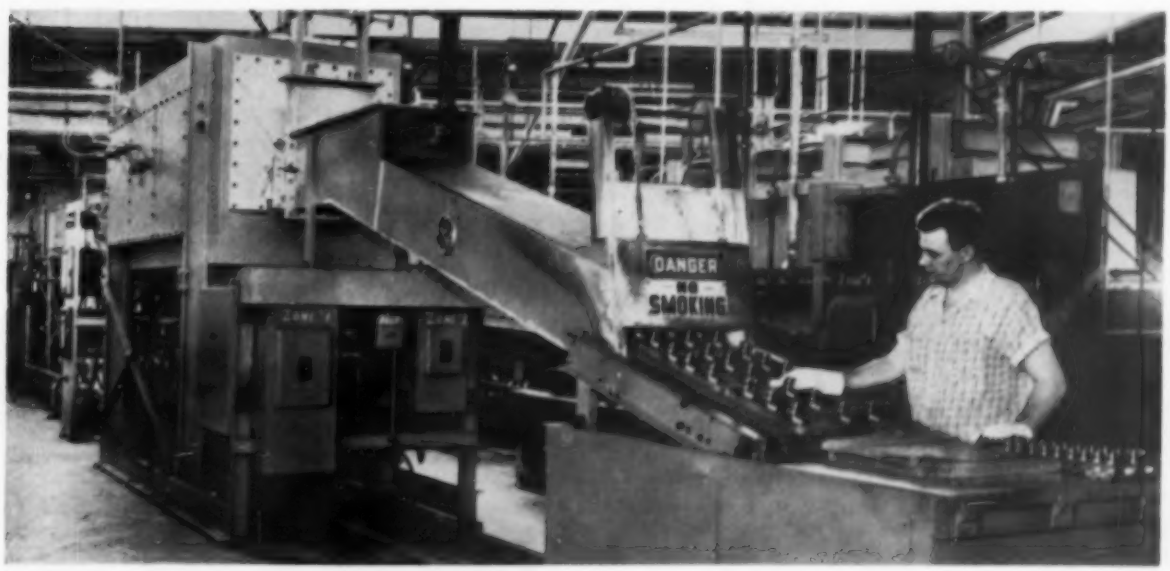
In mesh belt or manual-pusher type furnaces, there is usually no special provision for cooling the work other than that which automatically accompanies the usual transfer between adjoining heating and cooling chambers.

Over-all time-temperature cycles vary widely, depending on type of furnace, weight and nature of load, soaking periods required, etc. Heating and cooling may take from 40 minutes to 40 hours.

Atmospheres

Protective gases commonly used for bright brazing stainless are hydrogen, dissociated ammonia, argon and helium. Traces of air (about 1 micron pressure), or larger amounts of argon, helium or hydrogen in a vacuum are sometimes used.

In all cases, high purity is of prime consideration. Argon and helium are not reducing agents, so parts oxidized by welding will not



Hump mesh-belt furnace brazes lightweight stainless assemblies continuously. Atmosphere gas consumption is low. Inconel muffle through heating chamber prevents contamination of gas

Looking up into bell furnace for bright brazing stainless. Moly heating units have lasted seven years at temperatures to 2300°F. Bell furnace protects moly units with a reducing atmosphere

The elevator furnace has its own hoist. Workloads are moved up into its open bottom. Car-type bases and retorts have water-cooled rubber seals

be reduced by them during the brazing cycle.

Hydrogen — Hydrogen must be free from oxygen and oil and have low moisture content. In some localities, it can be purchased to the necessary specifications in cylinders, but most brazing installations include a catalytic conversion unit for transforming oxygen in the hydrogen to water vapor and a regenerative-type dryer for removing the water vapor.

The degree of dryness specified varies. Some users believe that −70°F hydrogen supplied to the inlet of the retort or muffle will take care of practically any requirement; others disagree.

Dew Point—The dew point of the hydrogen leaving the retort or muffle is important. Many brazing furnaces have gas outlet pipes from the retorts or muffles, from which dew point checks can be made. The location of the checking outlet has a bearing on the dew point reading.

One user prefers to have this outlet at the most unfavorable location so he can be confident that the dew point is better than that measured, if there is a difference.

Reduced—As the load heats up, water vapor is driven from the surfaces of the work, fixtures, load supports and the retort lining. Oxides on the surfaces of the hot work are reduced.

The dew point from the retort sometimes reaches 10°F even with hydrogen entering at −70°F. In such cases, it is best to wait for the dew point to drop to a proved level at 1800-1900°F before proceeding through the melting range of the filler metal.

Some users wait at the soaking temperature until the dew point reaches −20 to −30°F; others wait for −45 to −50°F before increasing the temperature. The low outlet dew point indicates that oxides on the workload are reduced and joints can be brazed.

Contaminants — Hydrogen must be free from sulphur. In one instance, a user received some sulphur-bearing hydrogen from a vendor and did not realize it until several thousand dollars worth of material was spoiled. Not only were the assemblies ruined, but the alloy muffle and belt were seriously damaged.

The method of manufacturing hydrogen has a direct bearing on impurities contained. When hydrogen is made by some processes, it can contain carbon monoxide or methane, from traces up to 0.5 per cent. Carbon monoxide and methane can carburize inlet tubes, retorts, muffles and stainless steel work.

Limited — Dissociated ammonia, which is 75 per cent H_2, 25 per cent N_2 with dew point of −40 to −60°F, is used for copper brazing stainless steels in furnaces with short time cycles. Owing to its lower cost and relatively high purity, it is used as a substitute for dry hydrogen.

It does, however, have limitations because of its nitrogen content. Molecular nitrogen in the dry state will nitride chromium, titanium and aluminum in the base metals and chromium and boron in nickel - chromium - silicon-boron filler alloys.

Thickness — Conditions which may cause superficial nitriding on a heavy section can cause substantial nitriding throughout the thickness in a thin foil section. In brazing stainless honeycomb sandwiches,, dissociated ammonia should never be used.

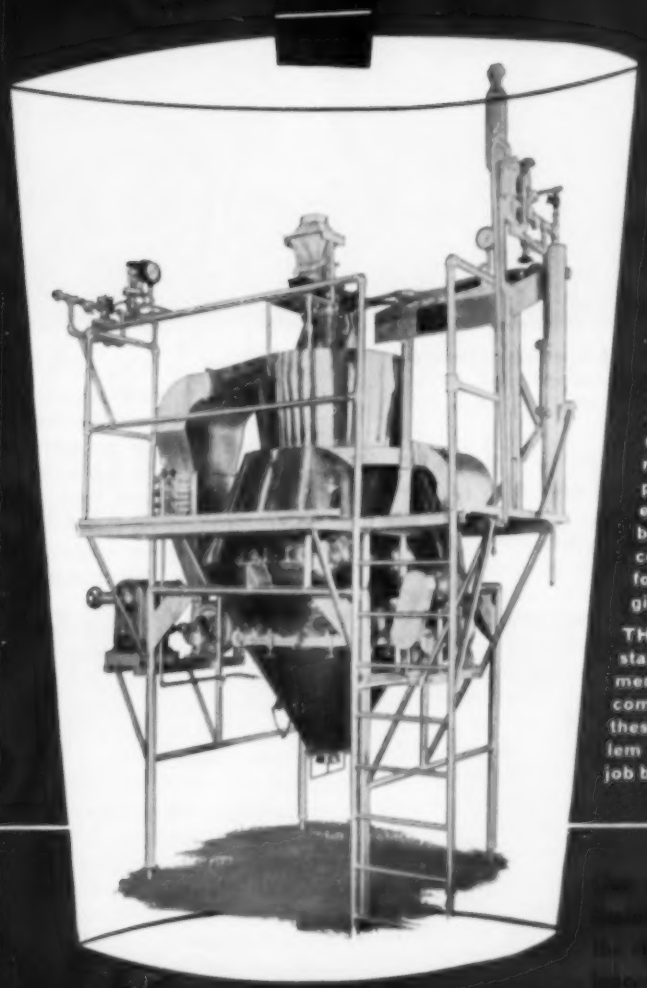
All high strength precipitation hardening alloys, such as 17-7 PH, have carefully balanced austenite and ferrite formers. Nitriding may upset this balance and cause little response to heat treatment.

Poor Wetting—Nitriding of filler metals such as the AMS 4775 type, results in poor wetting and flow.

One user found it necessary to grit blast and copper plate type 321 and 347 stainless before copper brazing in a hump mesh-belt furnace with dissociated-ammonia atmosphere to prevent nitriding and to assure good wetting.

Inert Gases—Argon and helium

Goes Well With Water



HOUSE OF STAINLESS

THE NEED—When Blaw-Knox engineers were developing their new Instantizer for processing dried foods, they had to have a versatile material to meet both production and operational requirements. It had to lend itself to the many processes involved in building this intricate equipment. And, in service, the material had to be sanitary, easy to clean, resistant to attack from constant moisture, impervious to retention of food odor and flavor, and, of course, it had to give long service life.

THE ANSWER—From their long experience with stainless steel in fabricating spray drying equipment, Blaw-Knox knew that there was only one commercially-available material that would meet all these requirements—stainless steel. The only problem was to select the stainless that would do the job best.

The House of Stainless

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CHICAGO STEEL SERVICE COMPANY

Milwaukee District Office:

Equipment used to copper braze jet engine tube-manifold assemblies of Inconel tubing and 316 stainless forgings or investment castings—electric bell furnace (right), water jacketed cooling bell (center), steel retort with sand seals (left)

are available in high purity. Because they are inert, they will not combine with other elements, even at high temperatures. Careful steps must be taken to retain the high purity; any infiltrating air or water vapor could oxidize the stainless with nothing present to counteract it.

One method of using these gases for bright brazing stainless is to first evacuate the retort, then introduce the argon or helium and proceed through the heating and cooling cycles.

Another method is to enclose the assembly in a separate envelope within a larger retort filled with argon or helium, and draw a partial vacuum on the envelope with a stainless-steel connecting tube and mechanical pump. Gas is sucked into the envelope through a tiny hole in the end opposite the vacuum connection. As an alternative, the envelope can be placed in an open-brickwork furnace with the gas inlet pipe leading to the tiny hole from an external source.

Newest — Vacuum brazing of stainless appears to have a promising future. Improved ductility of bonds is a frequently reported benefit. There are no gaseous reactions with base metals. High-cost gases are not needed, except where they are used with vacuum.

One investigator states: "Almost anything which can be brazed in dry hydrogen generally can be brazed better in vacuum.

"So far as the standard run of stainless steels goes, I haven't found one yet that wouldn't wet as well, or better, in vacuum as in dry hydrogen. A-286 is not easily brazed in vacuum; it is more difficult than Inconel X. Inconel X comes out of vacuum brazing (2150°F at 0.1 micron pressure) with a mirror bright surface. The A-286 will be from a light tan to a dark brown, depending on its composition, its prior treatment and what you braze it with. Alloys easy to braze in a vacuum (that are real stinkers in dry hydrogen) are M-252, Inco 702 and Inco 700. It seems that in the nickel-base 'superalloys,' increases in aluminum content do not impair the brazability, but increases in titanium do.

"So far as pressures are concerned, the lower you go, the better. Most of our vacuum work has been done below 1 micron and a lot of that below 0.1 micron. But in some instances, pressures can go up to 50 microns with good results.

"No weight loss has been detected in tests on AMS 4775 type alloys with prepared weight-loss samples. With silver brazing alloys, a considerable quantity of the cadmium, and to some extent, manganese, volatilized away.

"Stop-offs must be selected with care. The best one is a mixture of titanium dioxide and magnesium oxide in a lacquer vehicle."

Vacuum Purge—In some recent installations of bell-type furnaces, vacuum is used for purging the retorts at the beginning and end of the cycle. It is a substitute for inert gas purging with lean exothermic gas or bottled nitrogen.

A few minutes are saved since the vacuum purging is slightly faster. Vacuum purging gives a good check on the tightness of the retort and base cover before the atmospheric gas is introduced.

Interest—With the increased usage of stainless steels and the need for strong, tight bonds in fabricating a variety of stainless assemblies, brazing is well established. Brazed assemblies are reducing costs and making it possible to fabricate items which could not be manufactured in any other way.

The field is an expanding one and is engaging the interest of considerable high-class talent in metallurgical research and development.

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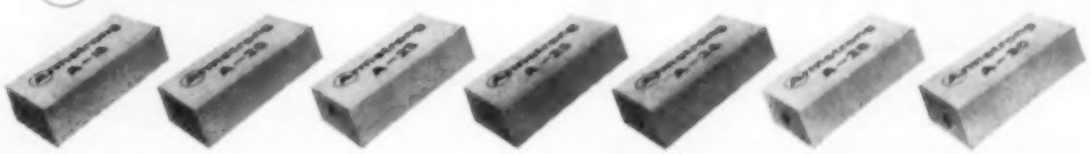
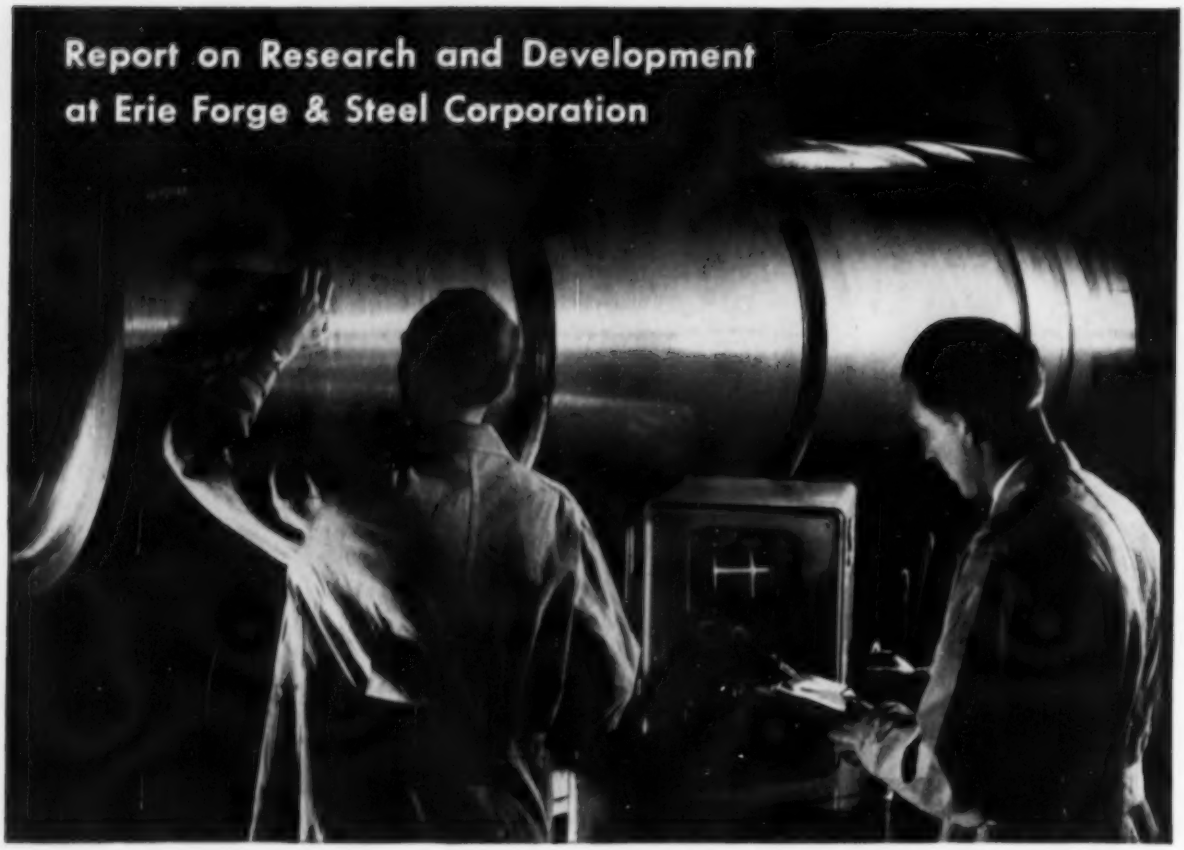


Report on Research and Development at Erie Forge & Steel Corporation



Shaft is rotating during non-destructive sonic test

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Crane Controller

ADAPTING an overhead trolley crane to a flexible control solved tight space and high cost problems for a large eastern warehouse. The modification permits an operator to avoid hazardous positions while moving large loads of heavy gage steel.

The alternative was the installation of an expensive new crane.

Results: Safety records have been improved, and the usefulness of the crane has been increased 50 per cent.

Difficulties—Due to space restrictions in the warehouse, it is difficult to provide regular aisles. Operating costs were high because the operator must stay away from the load.

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The cranemaker (Wright Hoist Division, American Chain & Cable Co., York, Pa.) suggested converting the pushbutton station from a fixed position to an outrigger channel which is independent of the trolley. Two reels, one on each side of the crane, permit the operator to move back and forth, yet maintain control.

Others—The same system can be mounted on most trolley type cranes. For spans longer than 35 ft, a special curve in the support stabilizes the control pendant. It stays where the operator leaves it rather than traveling to the nearest side.

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You will see how one man can install this tamper-proof, vibration-resistant blind rivet in a split second. Townsend blind rivets provide high clinch and a strong fastening method for many applications that otherwise would be slow and expensive. For information on the G-80 gun and blind rivets, write Townsend Company, P.O. Box 237C, New Brighton, Pa.

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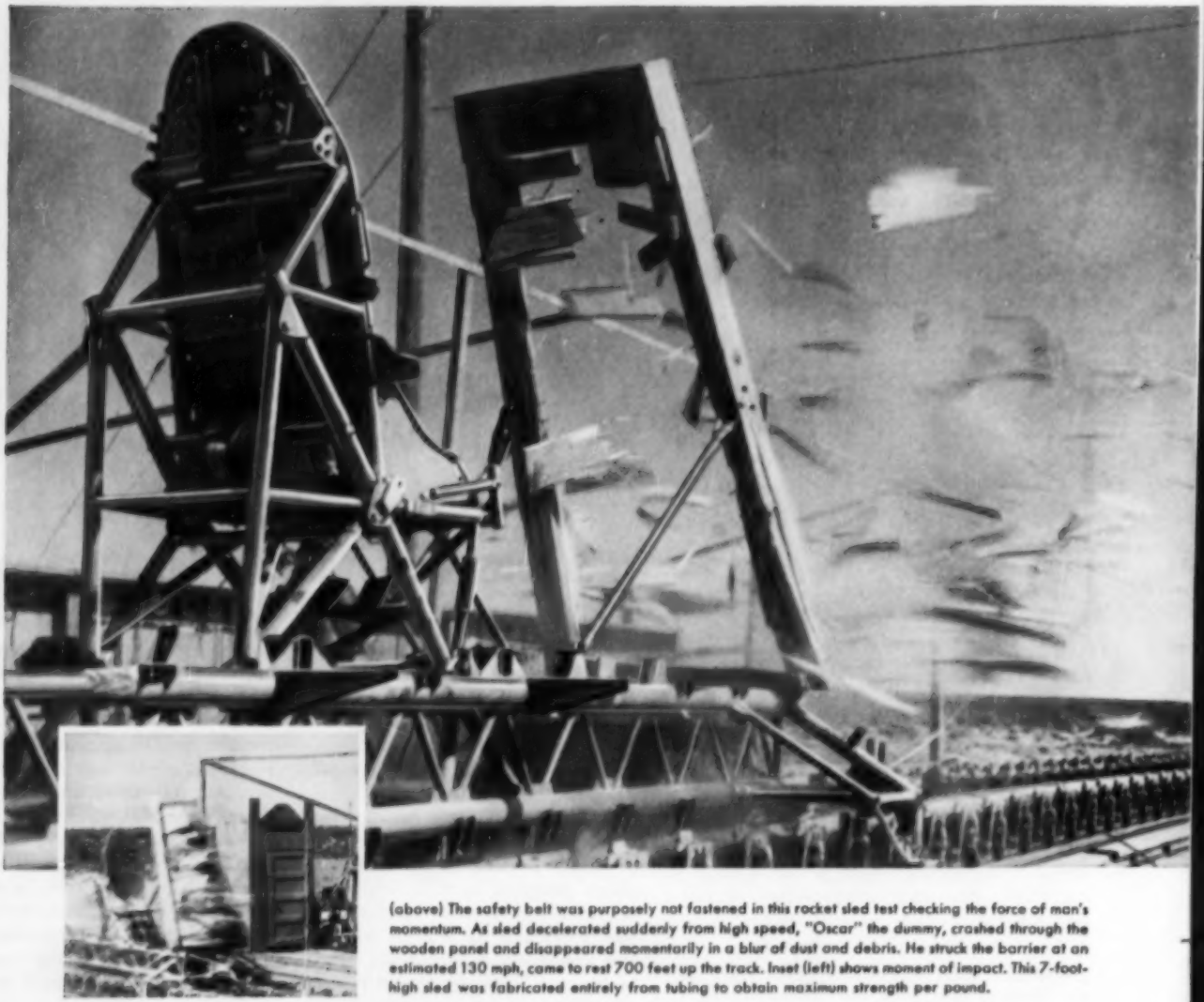

(above) The safety belt was purposely not fastened in this rocket sled test checking the force of man's momentum. As sled decelerated suddenly from high speed, "Oscar" the dummy, crashed through the wooden panel and disappeared momentarily in a blur of dust and debris. He struck the barrier at an estimated 130 mph, came to rest 700 feet up the track. Inset (left) shows moment of impact. This 7-foot-high sled was fabricated entirely from tubing to obtain maximum strength per pound.

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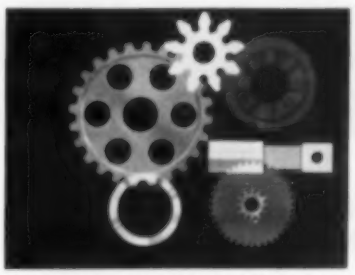

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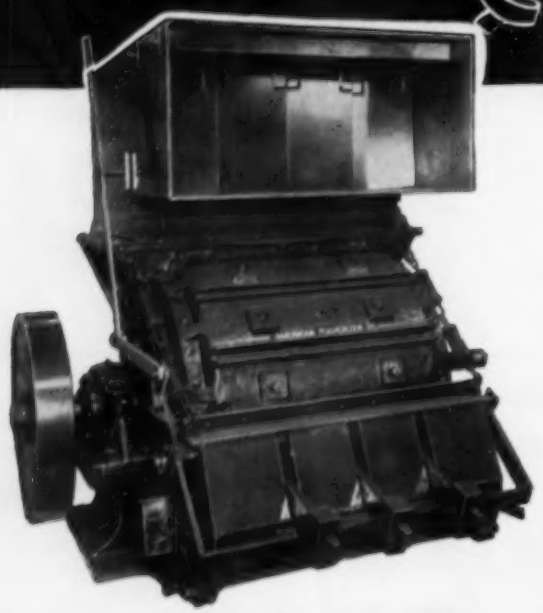

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That single machine turning of curled-up steel shown above can be mighty troublesome and costly to your operations.

Gnarled up with thousands of others like itself, it becomes a problem in space . . . gallons of re-usable cutting oil are trapped in the folds . . . and the scrap value is greatly minimized.

Answer? Run this tangled waste through an efficient, AMERICAN METAL TURNINGS CRUSHER. Out come sized ships that are easy to handle for shoveling or pneumatic handling . . . easy to store (savings in space up to 75%) . . . easy to spin for oil recovery . . . and crushed turnings command a higher price.

The cost is easy, too, on your scrap recovery program. Pays for itself. WRITE for illustrated literature.

RECLAIM FUSED WELDING FLUX
American Hammermill reduces fused flux to fine regranulation for perfect re-use. Why throw away profits! Details on request.

WRITE for Coal Crushing Bulletin

American PULVERIZER COMPANY

1539 MACKLIND AVE. • ST. LOUIS 10, MO.

Cutting Table

Oxyacetylene torches cut both the work and the table rails. Here's a way to cut replacements

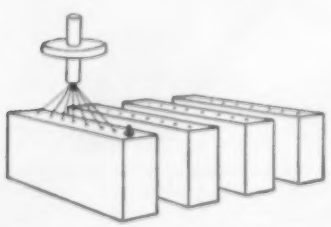
ARE YOU tired of replacing the rails or angle irons on the table you use for layout or oxyacetylene cutting?

Here's a trick that the Worthington Corp., Harrison, N. J., uses in its heavy plate fabricating shop. It's cheap, hardly ever wears out and is simple to replace.

Pin—The trick is a pin shaped like a roller with a long axle. It can be varied to suit the size of the work—thick for heavy plates, or thin for lighter work.

You don't use a table but a series of thin, concrete piers, topped with a plate drilled to accommodate the axle of the pin. The ends of the pin are rounded or tapered, and when one end wears out, the pin is turned over and the worn end inserted in the hole.

The shop superintendent reports that the cutting torch hits the pins less often than it would a bar or rail. Replacements are kept nearby in a nail keg.



Below is a typical table with replaceable rails. Pins like those above hold the work at fewer points, wear out less frequently

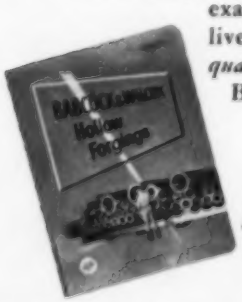
Wide Size Range . . . in Any Quantity . . . Builds UTILITY Demand for B&W HOLLOW FORGINGS

American Gas and Electric...Carolina Power & Light . . . Commonwealth Edison . . . and Wisconsin Electric Power, are typical of the leading Electric Utilities that use B&W Hollow Forgings for main steam, reheater, feedwater, and similar lines.

They find B&W Hollow Forgings offer a sound solution to their piping problems. Available in a wide range of sizes and material, these heavy-duty forgings can be specified to exact design requirements delivered right to the job, *in any quantity.*

Because they are made from high quality carbon, alloy and stainless steels, carefully produced under controlled conditions from the initial melt through final inspection, B&W Hollow Forgings offer the user savings in time and money.

Also, because of B&W's specialized manufacturing process, Hollow Forgings can be made to unusual design specification—either in special shapes or with special end preparations such as end closures, reduced sections, and Van Stone flanges. For additional information, write directly to The Babcock & Wilcox Company, Process Equipment Department, Barberton, Ohio.



Ask for this Bulletin: S-16B

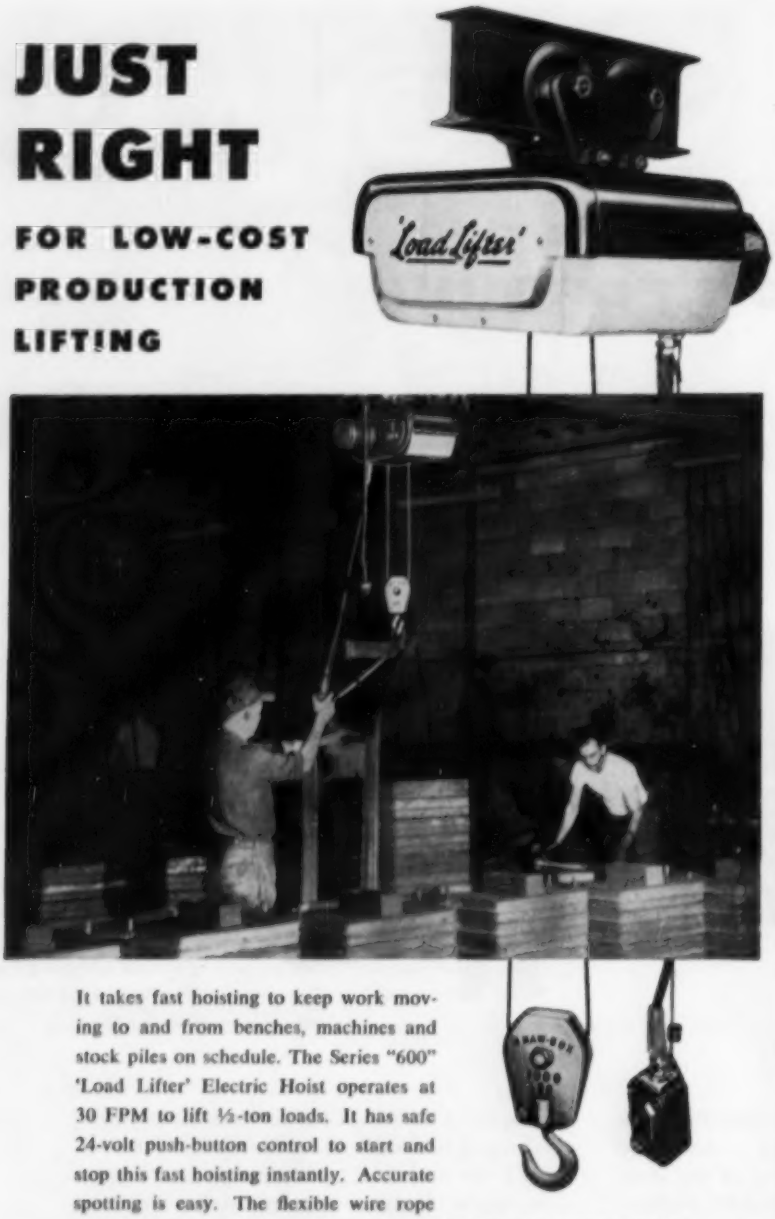
BABCOCK & WILCOX

BOILER DIVISION

S-461

JUST RIGHT

FOR LOW-COST PRODUCTION LIFTING



It takes fast hoisting to keep work moving to and from benches, machines and stock piles on schedule. The Series "600" 'Load Lifter' Electric Hoist operates at 30 FPM to lift ½-ton loads. It has safe 24-volt push-button control to start and stop this fast hoisting instantly. Accurate spotting is easy. The flexible wire rope permits nominal side lifts with complete safety for man, load and hoist.

If your production suffers from slow load handling, learn how the Series "600" 'Load Lifter' Electric Hoist can improve your timetable and cut your costs. Capacities: ½ and 1 ton. All types of suspension. Get details from your "Shaw-Box" Distributor or write us for Bulletin 408.

MAXWELL MANNING M&M MOORE INC. TRADE MARK

'Load Lifter'® ELECTRIC HOISTS

MANNING, MAXWELL & MOORE, INC.

MUSKEGON, MICHIGAN

Builders of "Shaw-Box" and 'Load Lifter' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' and 'American-Microsen' Industrial Instruments, and Aircraft Products.

Draw Rejects Down

Revised drawing dies cut an appliance maker's scrap rate from 25 to 1½-per cent

A SWITCH from iron casting dies to cast-to-shape, tool steel ring dies reduced scrap on crisper pans from 25 to 1½-per cent at Norge Division of Borg-Warner, Chicago.

The new, high carbon, high chrome dies were made at Allegheny Ludlum Steel Corp.'s Ferndale (Mich.) forging and casting plant.

Severe Draw—Norge draws the pans from 19 gage enameling steel on a 350-ton hydraulic press. The draw is severe—a 52 per cent reduction.

The scrap rate was high. Out of 30,000 pieces produced, 8000 were scrapped because of cracks or tears.

DRAW DIES

. . . turn out refrigerator crisper pans

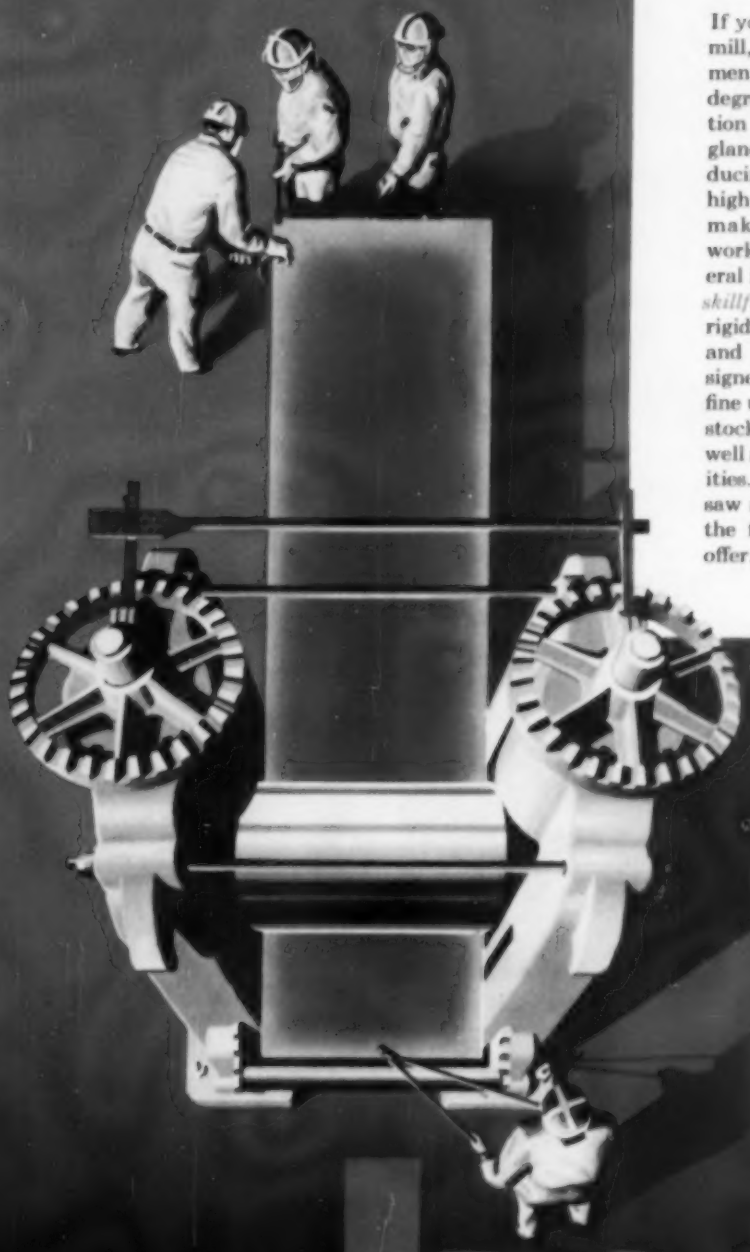
Costly—A new approach was in order. Dies were expensive. Redressing after every 10,000 pieces cost $1300 per die.

Engineers decided that new dies should be made by taking a 2 in. cut off the top of the original dies and using their cavities. This was done for about $5000 per die.

Good News—The dies have been in operation for more than 18 months. Over 500,000 pieces have been produced on each.

They show little wear and it looks like twice as many pieces can be produced before they will need to be redressed.

How Jessop skill makes better saw steel



If you could peer down into the Jessop mill, chances are you'd see groups of men hand-rolling sheets of steel with a degree of skill and careful concentration that might seem excessive at first glance. *Yet it isn't.* These men are producing a very special steel—top quality high-speed sheet which is used in the making of hack-saw blades, woodworking tools, metal-slitting saws, general industrial knives, and the like. But *skillful finish rolling isn't all.* Jessop rigidly controls its melting formulas and pours small ingots specially designed for cross rolling. This insures a fine uniform grain structure so that the stock blanks well, forms well, swages well and has superior edge holding qualities. Remember, when you order your saw steel from Jessop, you are buying the finest that Jessop experience can offer. *And that's mighty fine steel.*

JESSOP

STEEL COMPANY · WASHINGTON, PENNSYLVANIA

OFFICES IN PRINCIPAL CITIES

Jessop Steel of Canada Limited Wallaceburg Toronto

Jessop Steel International Corp. Chrysler Building New York, New York

High Production Shearing is done at The S. K. Wellman Co., Cleveland, with this No. 110 Steelweld Shear.

For High Production Shearing **STEELWELDS are "TOPS"**

"What makes Steelweld Shears tops?", you ask. "Why are they so outstanding for high production shearing?" Here are some reasons:

1 EASY, FAST OPERATION Electric foot control, standard on Steelwelds, enables shearing speeds not attainable with ordinary mechanical foot treadles. Easily operated by a mere touch of the toe, it can be moved on floor to wherever most convenient.

2 SMOOTH, CLEAN CUTS Unusually smooth, clean cuts are obtained because of Steelweld's exclusive pivoted-blade cutting action. The upper knife travels in a circular path and pulls away from lower knife immediately after shearing. This prevents binding of cut pieces between back gauge and knife. Knife wear is reduced.

3 QUICK, SIMPLE KNIFE ADJUSTMENT Best possible cut for any thickness plate can be made, because of Steelweld's exclusive Micro-Set knife clearance adjustment which can be made in a few seconds.

4 CONVENIENT, ACCURATE BACK GAUGE Before the gauge at rear of an ordinary shear can be reached, a Steelweld back gauge is usually set and the machine in operation, because the adjustment is on the outside of frame near front where conveniently reached. Ball bearing equipped, it is easily operated and accurate.

5 MAXIMUM PRODUCTION Steelweld Shears are built for heavy-duty high production work. The one-piece welded steel frame and all operating details are liberally designed to provide extra stamina. Servicing is simple. All parts are easily accessible. As a result, downtime is minimum and production maximum.

GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

7831 East 282nd Street, Wickliffe, Ohio

STEELWELD PIVOTED BLADE SHEARS

Canned Motor

ATOMIC reactors depend on coolant pump motors to circulate radioactive fluids. To make sure that there is no leakage, the motor is welded inside the fluid system.

The largest canned motor ever built has been completed by Westinghouse Electric Corp., Pittsburgh, for the 60,000 kilowatt pressurized water reactor at Shippingport, Pa. It has been tested since June, 1955.

Construction—The motor pump is hermetically sealed. It will circulate 18,300 gallons of radioactive water per minute through the primary loop. (Pressure is 2000 psi; temperature is 500°F.) Pressure rise across the pump is 115 psi. The motor is a 1200 kilowatt, 2300 volt, single winding type that can be operated at two speeds.

COMPLETELY SEALED
. . . motor pumps radioactive water

The motor pump uses no external shaft seal, and the suction and discharge lines are welded to the pipeline. Corrosion-resistant seals prevent the fluid from entering the rotor and stator windings. The fluid being pumped fills the rest of the magnetic gap. The only auxiliary equipment needed is a supply of cooling water.

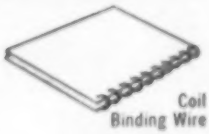
Contract — Westinghouse is building the nuclear portion of the Shippingport plant. Duquesne Light Co., Pittsburgh, will build the electric generating portion and operate the plant when it is completed in 1957.

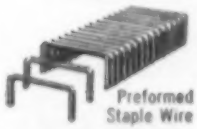
Wire for Paper Clips

Piano Covering Wire

Whatever your problem is in ***Wire...***

Thousands of wire applications in over a half century — involving virtually every kind of a wire problem — that's the experience and background we offer you in solving *your* special wire problems. We can supply wire from almost the size of a human hair, through $\frac{9}{16}$" diameter for metal fasteners . . . round wire or wire in special shapes, practically any size, temper, finish and analysis in low carbon and medium low carbon steels. We may have a valuable case history that parallels your own special problem. Fill out and return the coupon for full details of Continental's Wire Service. We are eager to work with you.


Coil Binding Wire


Preformed Staple Wire

Wire for Milk Bottle Carriers

Florist Wire

Wire Bales for Buckets, Pails, etc.

Wire for Toy Wheels

Standard and Special Wire Shapes

Fill out and mail today

Gentlemen: Please give us without obligation complete details of your special wire service.

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STEEL CORPORATION · KOKOMO, INDIANA

PRODUCERS OF: Manufacturer's Wire in many sizes, shapes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, and special wire. ALSO Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

RANSBURG *Electro-Spray* DOES IT BETTER... FOR LESS

Look what Ransburg Electrostatic Spray painting is doing in this eastern job shop, the Del-Val Finishers Division of J. W. Rex Company, Lansdale, Pa.

As a job shop, Del-Val handles a variety of work each month, painting hundreds of thousands of pieces and parts of various sizes and shapes.

The versatility and flexibility of Ransburg Electro-Spray makes it ideal for their varied painting requirements. Here's a typical example. Del-Val recently completed a contract for a Philadelphia manufacturer of barbecue trays with these results:

50% INCREASE IN PRODUCTION

50% SAVINGS IN LABOR and OVERHEAD

66% CUT IN PAINT COSTS, with improved, more uniform, and higher quality finish.

The job—flat sheet steel, 11" x 19"—enamel coated to withstand a 90 bend with sharp radius. Full coat one side; mist coat other.

WITH RANSBURG ELECTRO-SPRAY		BY FORMER HAND SPRAY	
Output, 375 panels per hour with 3 men		Output, 250 panels per hour with 4 men	
	per panel		per panel
Labor and overhead	.06	Labor and overhead	.12
Paint & lease cost	.017	Paint cost	.044
TOTAL COST	.077	TOTAL COST	.164

Want to know what Ransburg Electro-Spray can do for you in YOUR finishing department? Write for our new No. 2 Process brochure. It tells the WHAT & HOW of electrostatic spray painting, and with numerous production-line examples, shows how other manufacturers are cutting finishing costs... increasing production, and improving the quality of their work with Ransburg equipment. Too, we have available now a new movie, "The Big Attraction," a 27-minute sound and color film on electrostatic spray painting.

Ransburg ELECTRO-COATING CORP.
Indianapolis 7, Indiana

RANSBURG

Air-Borne Furnaces

They are part of a finishing line for a maker of metal office equipment

SUSPENDING two radiant ovens from the ceiling gained valuable floor space for Wright Line Inc., Worcester, Mass. It also allowed an uninterrupted work flow and continuous freedom of movement through uncluttered aisles.

The firm makes a line of metal office equipment for handling, filing and transporting punched tabulating cards.

UP IN THE AIR
. . . parts emerge with baked-on finish

Work Flow—The ovens are part of a highly efficient, conveyorized painting and baking system. After a "fine-wrinkle" finish is applied to the units, they are conveyed ceilingward to pass through the overhead infrared ovens. Revolving slowly, they emerge from the ovens after 21½-minutes, with a uniform, one coat, baked wrinkle finish, one of the distinguishing features of the line. The oven units operate at 365°F.

Still suspended from the monorail conveyor, the finished units—completely dry and ready to be assembled and packed—are transported to the shipping area.

The heating equipment, made by Fostoria Pressed Steel Corp., Fostoria, O., consists of 28½-ft infrared ovens with 5 x 6 ft tunnel openings.

Two Boring-Heads Speed Facing of Transmission Parts

This Bore-Matic faces 270 valve bodies an hour at 75 per cent efficiency.

A constantly rotating trunnion-type fixture moves the parts in a circular path between and at right angles to the two boring heads. The opposed boring heads face two valve bodies clamped on each side of the fixture at the same time.

The 12-station fixture rotates at about ½-rpm; two parts are finished every 20 seconds.

Eight single point carbide facing tools are carried by each of the two multiple toolholders. The boring heads to which toolholders are fastened are slide mounted (6 in. travel) for tool change or adjustment of the stock removed.

The machine removes 0.050 in. of aluminum and provides a finish of 20 microinches or better. *Write*: Heald Machine Co., Worcester 6, Mass. *Phone*: 5-3191

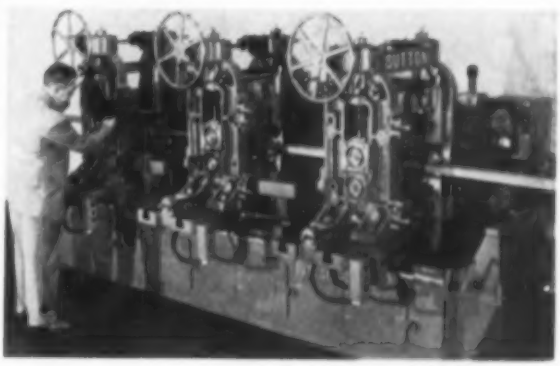
Multiple Rolls Correct and Straighten Aluminum Extrusions

Cross-sectional distortions in aluminum extrusions are effectively corrected by this machine.

It is furnished with one or more contour correcting stands. Additional stands can be added.

For simple shapes, a single stand can be used. For complex shapes, two or more stands are desirable to make multiple corrections in one pass.

The machine is designed for easy change-over to different extruded shapes. Multiple rolls of simple design are used to provide complete flexibility to correct the distortions that occur in the extrusion and heat treatment of complex shapes. *Write*: Sutton Engineering Co., First National Bank Bldg., Pittsburgh 22, Pa. *Phone*: Grant 1-8077



Plating, Anodizing Speeded by Automatic Loading

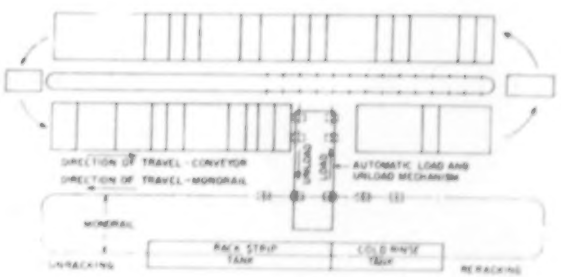
Metal parts are quickly handled to and from automatic metal finishing machines with the automatic load-unload mechanism.

An automatic transfer unit operates between a metal finishing machine and a Monorail conveyor.

Manual handling of parts entering or leaving the plating sequence is eliminated by the unit which loads and unloads work racks in the same indexing sequence as the finishing machine.

The loader shuttles on a pair of rails between the metal finishing machine and the Monorail and is indexed in exact sequence with them. Rails are placed either on the floor or in an overhead position.

The drawing shows the unit in position to load finished parts onto the Monorail and unload raw parts from it. At the top of the loader are two double stations, one for loading, one for unloading. *Write*: Hanson-Van Winkle-Munning Co., Matawan, N. J. *Phone*: Matawan 1-1000



NEW PRODUCTS and equipment

Measuring Thickness

The SO-100 Sonizon gives direct readings of thicknesses up to 5 in.

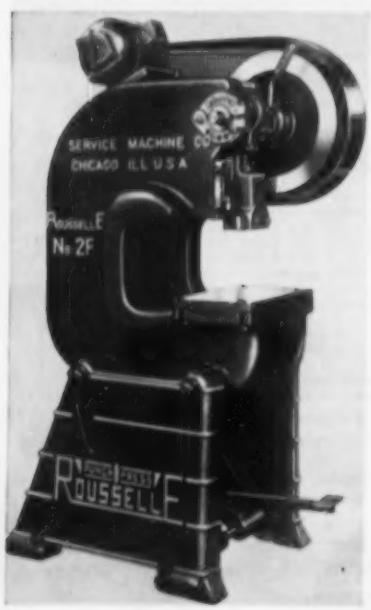
Readings are made from one side and are accurate to ± 1 per cent.

The ultrasonic instrument can be used for boiler or vessel inspection, aircraft overhaul inspection and preventive maintenance of hollow box beams. *Write*: Magnaflux Corp., 7300 W. Lawrence Ave., Chicago 31, Ill. *Phone*: Underhill 7-8000

Punch Press

Model 2F combines the advantages of an open back inclinable press with a deep throat unit, providing 12 in. of throat room.

The 15-ton unit has a heavily reinforced, rugged frame. Bearings are set closely to hold shaft deflection to a minimum.



True alignment is maintained by a stout ram supported by long, adjustable V-type guides. *Write*: Service Machine Co., 2310 W. 78th St., Chicago 20, Ill. *Phone*: Prospect 8-1200

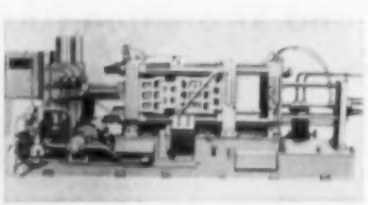
Low-Hydrogen Electrode

Easyarc 328 is for all-position welding of mild and low alloy steels. Iron powder is added to the coating for high welding speeds.

The electrode gives sound weld metal with smooth arc action and low spatter loss. *Write*: Air Reduction Sales Co., division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y. *Phone*: Murray Hill 2-6700

Die-Casting Machine

The model 600 comes in both hot and cold chamber models which have 600 tons of locking pressure.



Dies are locked securely, and castings are produced with a minimum of flash because the locking pressure is strain gage tested.

A universal, automatic timing control panel provides all desired cycles.

Die plates are 46 x 46½ in. Die openings range from 8 to 15 in. *Write*: Cleveland Automatic Machine Co., Cincinnati 2, O. *Phone*: Redwood 1-5300

Solder Fluxes

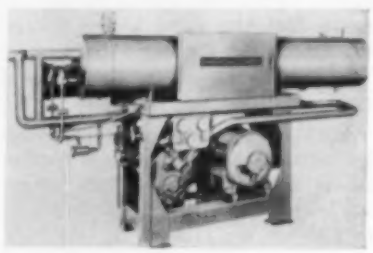
H-Series fluxes are noncorrosive and quick wetting. They are for use with copper and copper-base alloys.

The fluxes promote solder spread over a wide range of temperatures. Oxides are reduced to free metal as the temperature goes above 375°F.

During the soldering operation, the flux decomposes and vaporizes, leaving practically no residue. *Write*: Solder Flux Sales, Federated Metals Division, American Smelting & Refining Co., 120 Broadway, New York 5, N. Y. *Phone*: Rector 2-9740

Water Chillers

The Type CC line is for air conditioning or industrial cooling applications. Capacities: 20 to 150 tons.



Each unit has a reciprocating Freon 22 compressor, direct-expansion chiller section, heat exchangers, control panel and an electric drive motor.

Increased cooling capacity is provided by copper tubing which has star-shaped aluminum inserts. *Write*: American Blower Corp., Detroit 32, Mich. *Phone*: Trinity 2-4300

Indexing Machine

The Auto-Tran is a continuous motion unit for processing and manual assembly operations.

Rate of carrier movement is infinitely adjustable. Standard carriers or pallets may be faced vertically or horizontally. *Write*: Swanson Tool & Machine Products Inc., Erie, Pa. *Phone*: 2-6763

Variable Speed Drive

Vari-Mount units have capacities from 1 to 15 hp. Maximum speeds range from 15.1 to 711 rpm and minimum speeds are from 2.5 to 355 rpm.

Speed adjustment ranges are

WITH CHASE® S-19 PROCESS BRASS STRIP

CHASE S-19 BRASS is *unique* through and through! Special manufacturing techniques give it an exceedingly fine, uniform grain structure, and it has unusually high ductility. It is adaptable for forming or even relatively deep-drawing articles which are surprisingly scratch and dent resistant. They will buff or polish more easily, too.

It takes precise Chase quality control at the mill to produce the superb finish, stiffness and formability of Chase S-19 brass—*yet it costs you no more than commercial soft brass!* Call in a Chase representative for all the facts, today!

Chase

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WATERBURY 20, CONNECTICUT

SUBSIDIARY OF KENNECOTT COPPER CORPORATION

The Nation's Headquarters for Brass, Copper and Stainless Steel

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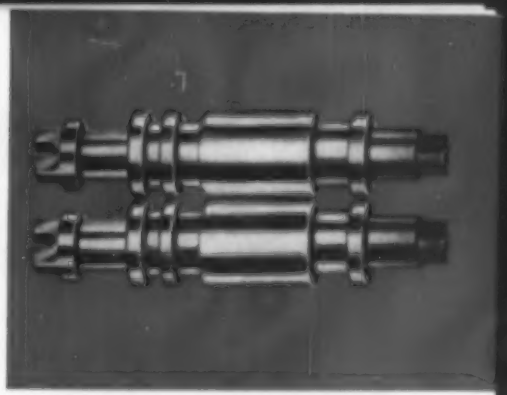
CONTINENTAL

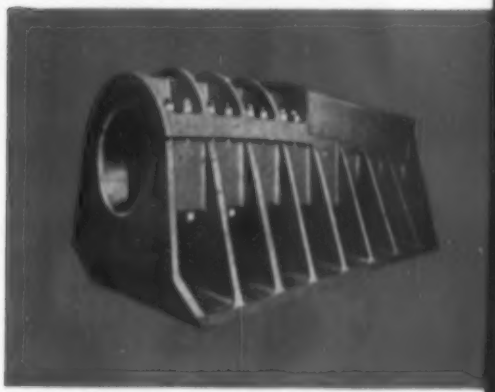
CONTINENTAL 40-inch, 2-high reversing blooming-slabbing mill in the Fairless Works of the United States Steel Corporation.



ROLLS—iron, alloy iron and steel rolls for all types of rolling mills.

BLAW-KNOX

makes what it takes to handle tough blooming-slabbing operations



CASTINGS—carbon and alloy steel castings from 20 to 250,000 pounds.

In operation as an intermediate mill for subsequent rolling, this rugged Continental 40-inch reversing blooming-slabbing mill is providing excellent performance in the United States Steel's Fairless Works.

Variations of the basic design of this mill are built by Blaw-Knox to serve as break-down mills for billet and bar mills, rail and structural mills, and merchant mills.

Blaw-Knox designs and builds complete rolling mill installations—assumes undivided responsibility from preliminary engineering to satisfactory operation. At any time we'll be glad to discuss your plans with you.

WELDMENTS—fabricated steel plate, or cast-weld design.

50th Anniversary
BLAW-KNOX
1906-1956
CONTINENTAL

BLAW-KNOX COMPANY

Foundry and Mill Machinery Division

Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

Complete Rolling Mill Installations . . . including all auxiliary equipment . . . for ferrous and non-ferrous metals

Hot strip mills • cold strip mills • slabbing mills • temper mills • universal mills • plate mills • blooming mills • structural mills • rail mills • billet mills • rod mills • merchant mills • roll lathes • chippers • special machinery • and complete auxiliary equipment

NEW BETTER

Non-corrosive fluxes for Copper and Copper Alloys

Federated H-Fluxes are completely new! They are the most efficient, non-corrosive fluxes for soldering copper, copper alloys and any metal plated or coated with copper, tin, solder or silver. They can be stored for long periods of time without loss of efficiency.

Marked improvements in soldering efficiency and product quality are realized through use of these superior products.

Here are six reasons why:

1. **Federated H-Fluxes will never cause a joint to corrode.**
2. **H-Fluxes give improved solder spread.**
3. **H-Fluxes produce virtually no residue.**
4. **Washing after soldering operations may be eliminated.**
5. **H-Fluxes permit effective pre-fluxing and storing of parts before soldering.**
6. **H-Fluxes are safe to handle and store.**

Federated H-Fluxes can be used in all types of soldering: torch or iron, oven or dip, induction or automatic. Pints, quarts and drums are available from stock.

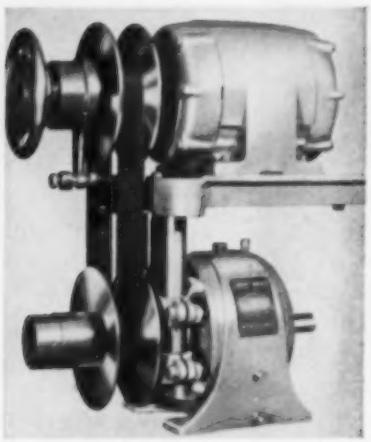
For prompt, detailed application information write to:

Federated Metals

DIVISION OF AMERICAN SMELTING AND REFINING COMPANY
120 BROADWAY, NEW YORK 5, N. Y.
In Canada: Federated Metals Canada, Ltd., Toronto and Montreal

Aluminum, Anodes, Babbitts, Brass, Bronze, Die Casting Metals, Lead, Lead Products, Magnesium, Solders, Type Metals, Zinc Dust

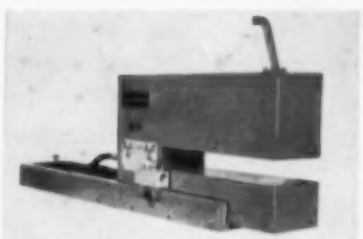
NEW PRODUCTS and equipment



available up to 6:1. The units come in horizontal and vertical models and can be operated by remote or manual control. *Write*: Foote Bros. Gear & Machine Corp., 4545 S. Western Blvd., Chicago 9, Ill. *Phone*: Virginia 7-4200

Radiation Gage

The compact measuring head is for mounting on close coupled, single-stand reversing mills, one-way mills or Sendzimir mills.



In rolling clad steel on a one-way mill the unit holds material with a specification of 0.0065-in. ±0.0002-in. almost entirely to ±0.0001-in. *Write*: Industrial Nucleonics Corp., 1205 Chesapeake Ave., Columbus 12, O. *Phone*: Hudson 8-0671

All-Position Electrode

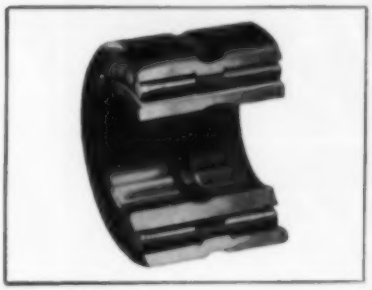
Fleetweld 5-P is a E-6010 electrode designed for pipe welding. It gives smooth arc operation, deep penetration and good bead wash-in.

The electrode produces a flat bead in an even deposit. Slag is easily removed. Minimum slag interference results in quick freezing

BEARING TIPS by McGill

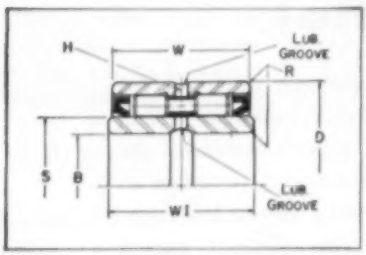
CAGELESS BEARING CORRECTS SKEWING

Guiderol Bearings carry greater loads in smaller spaces because they have no space wasting cages. A full complement of center grooved rollers extends the width of the race for maximum load support and a center guide rail avoids roller skewing that can bind a bearing under some loads. MT and CT series interchange dimensionally with ordinary needle bearings and cylindrical roller bearings.



First Sealed Full Type Roller Bearing Series

The SG series Guiderol bearing provides low-cost and flexible sealing where ordinary needle-type bearings with auxiliary seals have been too cumbersome and expensive. Interchangeable with the standard Guiderol bearing, the new SG series provides five sealing combinations.



140 Pages of Bearing Facts

Write for your copy of Catalog No. 52, a revised 140-page Bearing Selection Guide. It contains vital product information and 30 pages of engineering data.

GUIDEROL® BEARING CARRIES GREATER LOAD IN SMALL SPACE FOR McCULLOCH CHAIN SAWS

Bearings installed in 1944 still in use.

Load-carrying capacity in minimum space is given as the reason for using McGill Guiderol bearings on the heavy-duty loader made by the Farmhand Company. Four bearings support the shafts of the gear pump that furnishes hydraulic power to the loader. Guiderol bearings have been used by Farmhand since 1944 and virtually all of the loaders with the original bearings are still in use.

Assembly ease cited as an extra benefit

Rugged use in the field dictates rugged construction at the factory for McCulloch Motors Corporation gasoline engine chain saw units. The one-man and two-man chain saws must be light and compact but sturdy enough to operate at full capacity all day long.

Since switching to a McGill Guiderol Bearing as support for the crankshaft, McCulloch, like many machine builders, has proved that the Guiderol bearing provides the desired greater load capacity in small space and outlasts former units with minimum maintenance—important under rugged chain saw field conditions.

A bonus benefit is the ease of installation of the Guiderol bearing—with open ends and no end shoulders. Assembly is a simpler operation.

Insure performance with McGILL®

MULTIROL® GUIDEROL® CAMROL®
Full Type Roller Bearings

McGILL MANUFACTURING COMPANY, INC., 301 N. LAFAYETTE ST., VALPARAISO, INDIANA

Simple Arithmetic...
Type 302, Sheet Base Price 47.50 cents per lb.
Type 430, Sheet Base Price -36.75 cents per lb.
Saving 10.75 cents per lb.
in Stainless SHEET Costs!

Now you can SAVE $215 per ton in base price alone!

Many designers and fabricators who are currently using Type 302 stainless can, in numerous applications, specify Type 430 straight chromium stainless and take advantage of the 10¾ cents per pound difference in base price. Some of our customers are already saving more than $215 per ton using our 430 MicroRold stainless sheet.

The steel industry estimates that 50% of all stainless sheet applications could satisfactorily employ Type 430, the least expensive of all stainless grades, as an economical and practical material. When properly applied, Type 430 has all the desirable qualities of beauty, corrosion resistance, strength, long life and low maintenance that no other material, except stainless, can offer.

We are currently producing our MicroRold Type 430 sheets up to 48" wide in thicknesses .005" to .109" with 2B or 2D finishes; and in thicknesses .010" to .109" in No. 3, 4 and 7 finishes.

Send for Your copy, "Care and Use of 430 MicroRold Stainless Steel"

Washington Steel *Corporation*

10-0 WOODLAND AVENUE, WASHINGTON, PA.

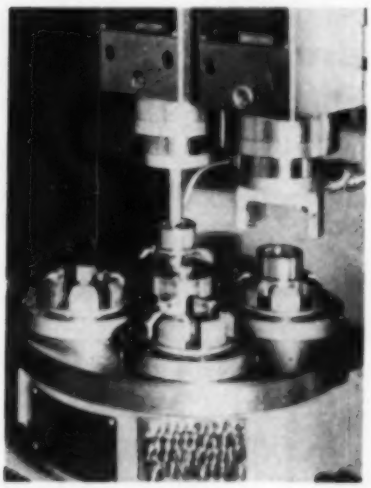
of the molten metal which tends to reduce porosity.

Electrodes come in ⅛ and 5/32-in. diameters. *Write*: Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17, O. *Phone*: Ivanhoe 1-8100

Automatic Index Table

Model AIT is guaranteed to be accurate within 0.0005-in. of true position.

On vertical boring machines, the table can be used for boring, drilling, turning or reaming.



Master index plates have 12 positions; masks are used to obtain spacings of 2, 3, 4 and 6. Irregular spacings can be furnished. *Write*: Wadell Equipment Co., 119 South Ave., Garwood, N. J.

Boring Tools

The micro-adjustable boring tools use indexable carbide tips which are thrown away when all cutting edges (up to eight per tip) are dull. The boring tools are fitted with a vernier-screw which adjusts for the diameter of cut. The circular dial has 20 graduations; each represents 0.001-in.

There is no backlash as the head of the adjusting screw is pulled up and locked against a locating face after the adjustment is made.

An adjustable built-in chip breaker serves as a clamp for

Big machine volume and speed in this compact new

PRINTMASTER 810

Sturdy, compact, smartly styled, the new medium-priced Printmaster 810 has *everything*—easy, low-cost operation, high speed and *big machine* production capacity.

It prints and develops in one continuous operation at speeds up to 40 feet per minute . . . easily handles roll or cut stock as wide as 42 inches. Easy-to-reach controls command quick response throughout the machine's entire operation. Developing and printing sections are automatically synchronized for simplest operation at any speed.

Complete diffusion of vapors through exclusive "jet-nozzle feed" insures uniform, dry, fully developed prints. Spacious receiving trays automatically stack prints in sequence. Electrically welded one-piece assembly stands 61" high, 61" wide, 42" deep (including feedboard).

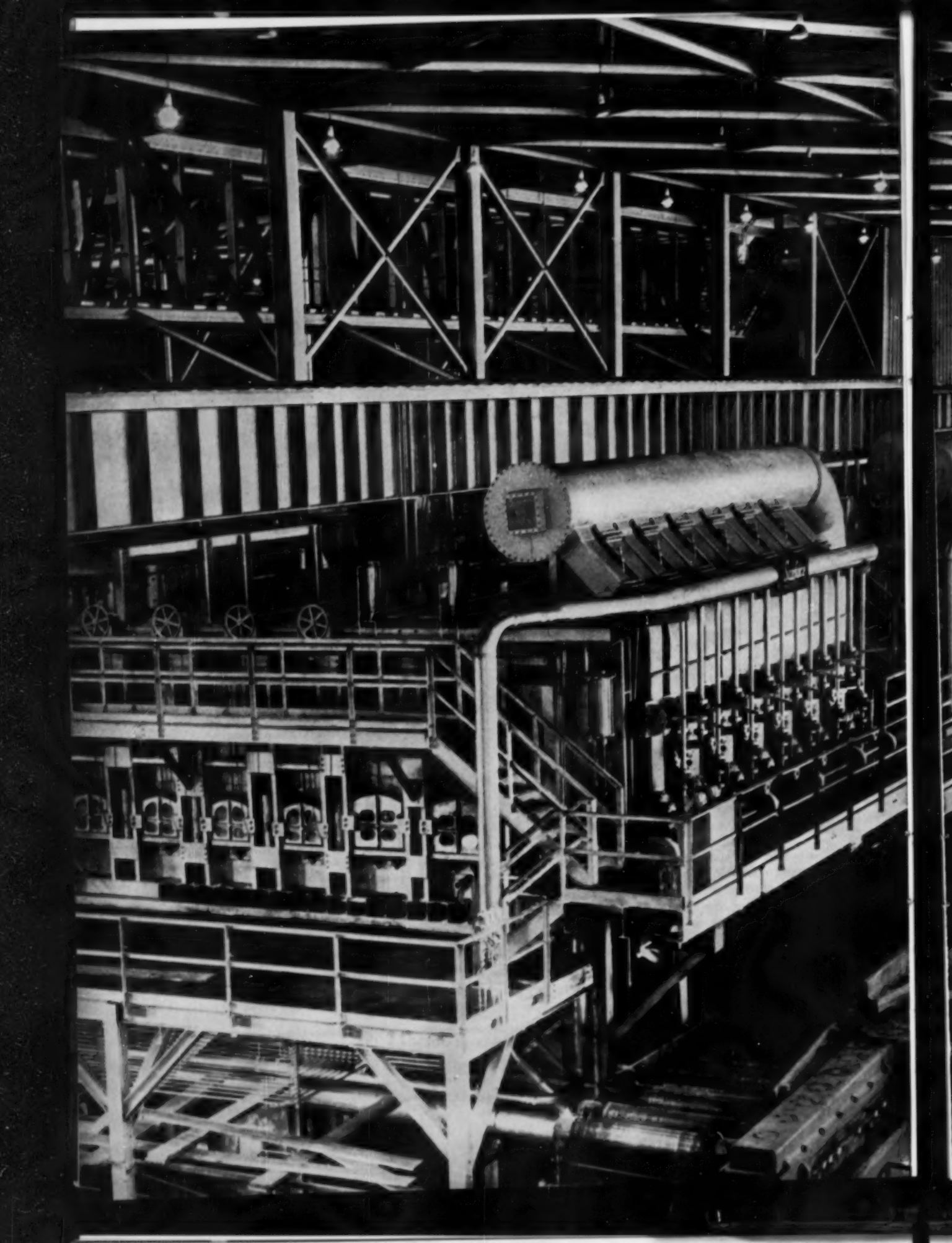
See and try the Printmaster 810 yourself. Call your nearest Ozalid distributor for a demonstration. His number's in the phone book, or write Ozalid, Dept. P-9, Johnson City, N. Y., for descriptive brochure.

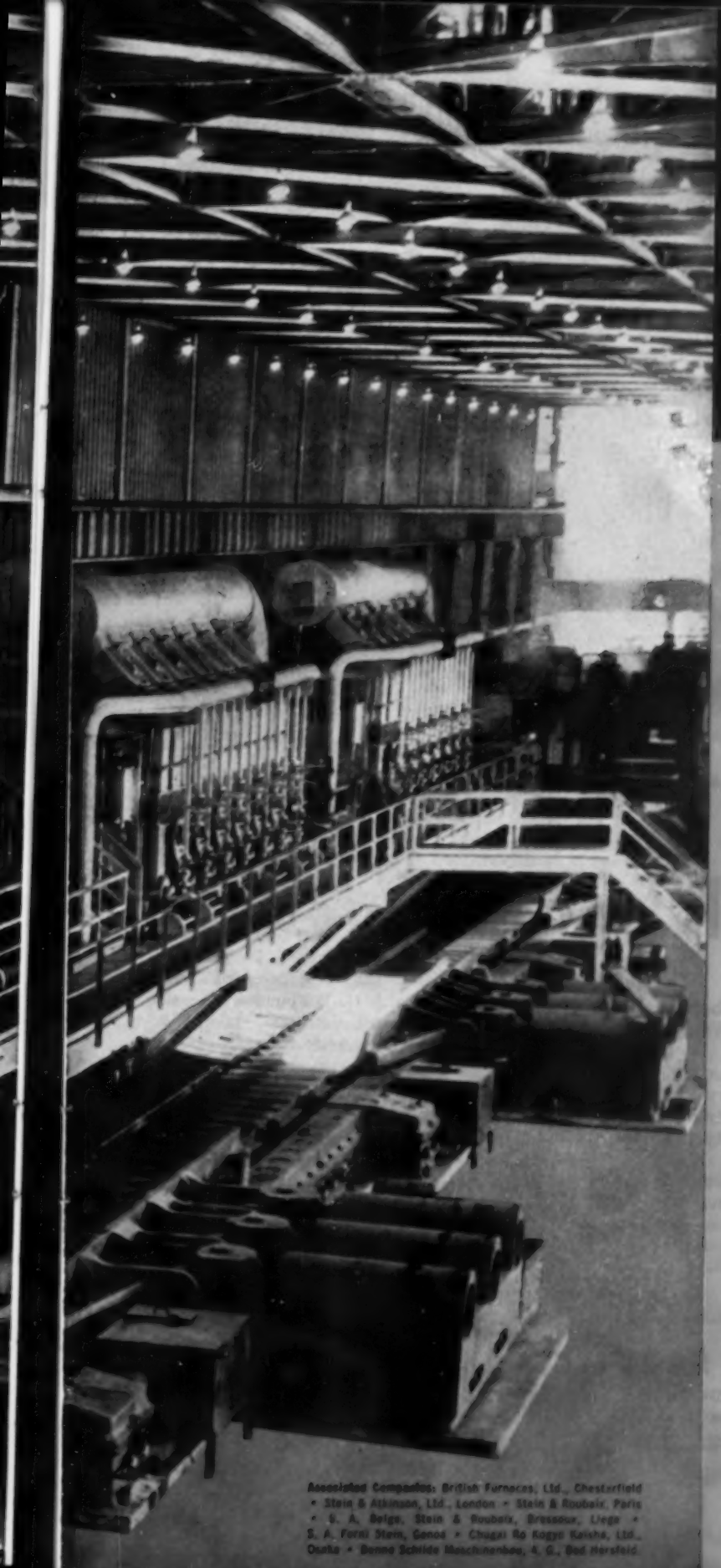
OZALID®
DIRECT COPY SYSTEMS

A Division of General Aniline and Film Corporation
In Canada, Hughes Owens Co., Ltd., Montreal

LOOK FOR IT!

Got A Printmaking Problem? Call your local Ozalid representative. His expert advice is yours for the asking—whether or not you now own or plan to buy Ozalid equipment.





200 TONS AN HOUR

CONTINUOUSLY

200 tons of steel slabs are heated to rolling temperature every hour, continuously, in each of these Surface monsters—world's largest slab furnaces.

No other furnace today can list all of these features:

1 Cantilever skid supports* permitting unobstructed combustion space for underfiring.

2 Furnace lines and burner design which provide high heat input from the moment the slab enters the furnace.

3 Built-in control* to prevent intermingling of gases from upper and bottom zones, providing better control of heat application, and preventing overheated slab end.

4 Anticipatory control which reduces temperature head when rate of slab discharge decreases.

5 Air preheat up to 1100°F.

6 Television signal to pusher pulpit, informing operator of the exact position of the leading slab.

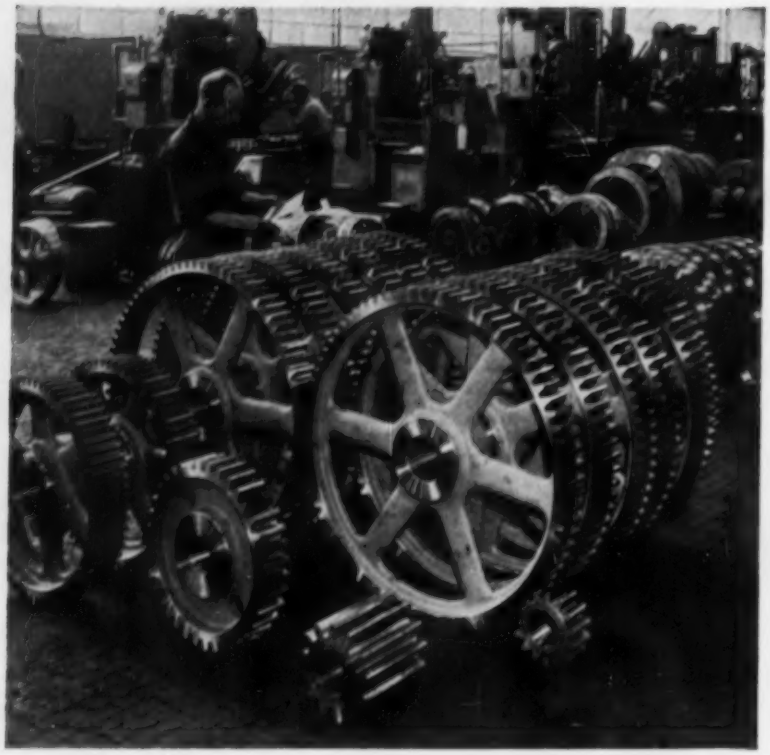
About the only conventional feature in these giants is the fact that the slabs are pushed in one end and out the other.

This is another demonstration that, at Surface, unconventional thinking and conventional experience are a productive team for the steel industry. Surface Combustion Corporation, Toledo 1, Ohio.

*patents pending

Surface
STEEL MILL EQUIPMENT

Associated Companies: British Furnaces, Ltd., Chesterfield • Stein & Atkinson, Ltd., London • Stein & Roubaix, Paris • S. A. Belge, Stein & Roubaix, Bressoux, Liege • S. A. Forni Stein, Genoa • Chugai Ro Kogyo Kaisha, Ltd., Osaka • Donna Schilde Maschinenbau, A. G., Bad Hersfeld



DESTINATION -Soaking Pits

These H&S steel spur gears will soon be lifting soaking pit covers for a leading steel producer. (We cut spur gears up to 144" outside diameter and 1 D.P.)

Similar large H&S custom-built spur gears have proved their dependability by serving Industry for over 50 years. Rugged construction and exact machining of all H&S gears assure quiet operation, uniform velocity ratio and freedom from vibration.

Let our years of experience in the engineering and manufacture of all types of gears be your assurance of an unbiased recommendation for the best solution to your requirements. Contact your H&S representative or send us your power transmission inquiries today.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 Hamilton Avenue
Cleveland 14, Ohio

NEW PRODUCTS and equipment

the boring tip. Round, square and triangular inserts can be used. Cutting edge of the tip is located slightly above center. *Write*: Weason Co., 1220 Woodward Heights Blvd., Ferndale 20, Mich. *Phone*: Jordan 6-1500

Hoist Hooks

This line of hoist hooks (up to 50 tons) is made in closed dies.

To insure proper service at listed capacity, each hook, after heat

treatment, is tested on a standard tension machine to 50 per cent beyond its safe working load. *Write*: J. H. Williams & Co., 400 Vulcan St., Buffalo 7, N. Y. *Phone*: Riverside 3200

Tooling

Tool style KSDN is for turning, profiling and chamfering in either direction. It uses square throwaway indexable inserts.

The tools come with either a 7-degree positive or 5-degree nega-

USCOLITE PIPE

$10,000-a-year saving with just $450 of Uscolite Pipe"

Rarely can you find a more corrosive environment than that of a tannery. For instance, pipes in one large Minnesota tannery (carrying salt, sulfuric acid, alkali, hard water and chrome liquor) became corroded and had to be replaced frequently, some as often as every week. Also, there was the constant hazard of dangerous chemical leaks. A piping break always damaged the floor, often stopped plant operations.

Then, 2 years ago, they ordered $450 worth of Uscolite® Pipe. Result: savings of $10,000 in just one year.

Similar savings are possible to metal working and metal producing plants where pipe must convey or be exposed to corrosive elements.

Uscolite plastic pipe is extremely light in weight, yet has very high impact strength. It is resistant to corrosive chemicals and is non-contaminating. The Uscolite line includes everything for a complete pipe assembly, including the Hills-McCanna Valve. Contact any of the 28 "U. S." District Sales Offices, any of the selected "U. S." Distributors, or write us at Rockefeller Center, New York 20, New York.

After 2 years on the job, note the smooth, unharmed exterior of Uscolite Pipe (at left) while metal pipes are heavily corroded.

Mechanical Goods Division

United States Rubber

to serve you

A call to any one of our seven warehouses will get you speedy service on your order . . . whether it's for *alloy steel bars, billets or forgings,* in any size, shape or treatment you need.

All seven warehouses are located in principal industrial areas. Each is modern and well-stocked, and staffed by expert metallurgists.

Call now if you need our own HY-TEN steels — "the standard steels of tomorrow", or standard AISI or SAE grades.

Or write for *free* copies of Wheelock, Lovejoy Data Sheets. They contain complete technical information on grades, applications, physical properties, tests, heat treating, etc.

In Canada: Sanderson-Newbould, Ltd., Montreal and Toronto

WHEELOCK, LOVEJOY & COMPANY, INC.

131 Sidney Street, Cambridge 39, Massachusetts

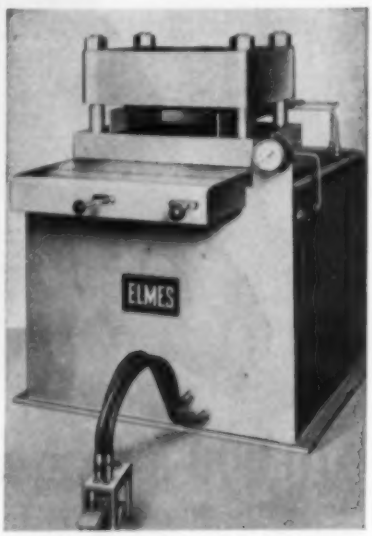
NEW PRODUCTS and equipment

tive back rake. Two styles of inserts are available. Utility inserts have the tops and bottoms ground. All surfaces are ground on precision inserts which can be indexed within ±0.001-in. *Write*: Kennametal Inc., Latrobe, Pa.

Small Presses

The Hydrolair is a pumpless and motorless unit that operates on shop air-line pressures.

The presses come in 30, 50, 75 and 100-ton models. They have either moving-up or moving-down



platens. *Write*: Elmes Engineering Division, American Steel Foundries, 1150-X Tennessee Ave., Cincinnati 29, O. *Phone*: Redwood 1-9210

Thickness Control

This x-ray gage provides a continuous process check and automatic thickness control for metal strips.

For aluminum, one gage is calibrated in a 0 to 0.015-in. range.

Want to net big grinding savings? Let Peninsular analyze your jobs

Grinding savings of both time and money often are hidden in unsuspected places. Peninsular Abrasive Engineers can quickly flush them into the open by making a comprehensive analysis of your complete operation. Their reports already have netted thousands of dollars a year for plants across the country.

For example, a semiautomatic machine stood idle for redressing after pointing only 8-10 high-speed drills. When Peninsular engineered a new wheel, production soared 400%, to 45-50 pieces between dressings, drastically cutting expensive downtime. In addition, wheel life increased 20%.

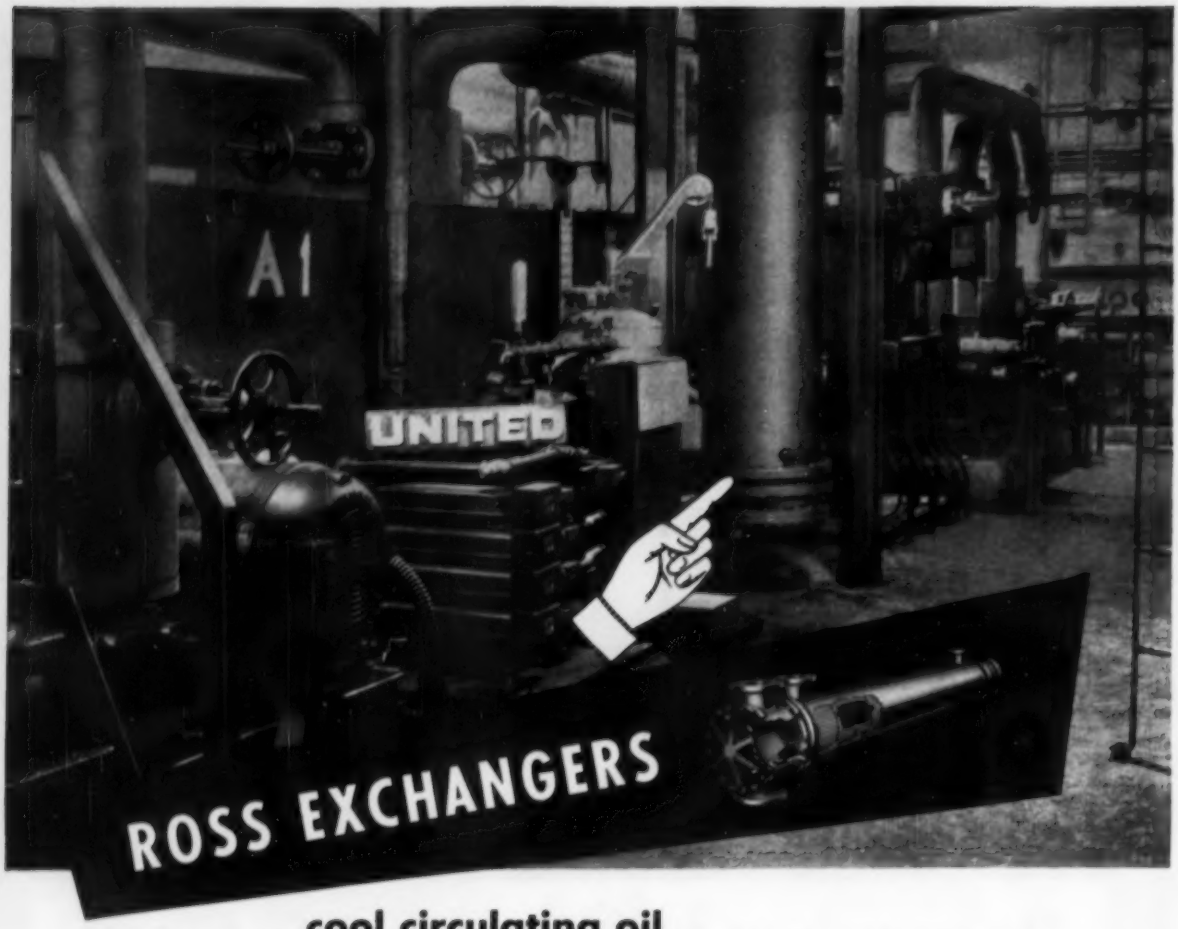
Call, write, or wire us today.

Vitrified and Resinoid Grinding Wheels

PENINSULAR

GRINDING WHEELS

PENINSULAR GRINDING WHEEL DIVISION—ABRASIVE AND METAL PRODUCTS COMPANY—DETROIT, MICHIGAN



cool circulating oil to protect hard working parts of United Rolling Mills

In spite of shock loads and blazing heat, United Rolling Mills have temperature-safe lubrication . . . and it's provided in a most dependable way:

In this mill oil cellar, as in others designed and built by United Engineering and Foundry Company, Ross Type CP Exchangers cool circulating oil to insure its viscosity and service life. Roll neck bearings and other hard working parts are given continuous protection.

Says United, "We use Ross Exchangers because of their high quality and the good service of their manufacturer." Throughout the metal industry, Ross Exchangers are counted on to safeguard the performance of engines, compressors, centrifugal pumps, extrusion presses, die casting machines, metal drawing presses, welders, speed changers and other primary equipment.

Providing the utmost in thermal efficiency and ruggedness, Ross Exchangers are pre-engineered and fully standardized in sizes to meet a wide range of oil, water, air and gas cooling requirements.

For detailed information, request Bulletins 2.1K5 and 1.1K5. Ross Heat Exchanger Division of American-Standard, Buffalo 5, N.Y. In Canada: American-Standard Products (Canada) Limited, Toronto 5, Ont.

ROSS

ROSS HEAT EXCHANGER PRODUCTS

NEW PRODUCTS and equipment

Direct settings and readings are possible to 0.00001-in. Other thickness ranges are available. *Write*: Pratt & Whitney Co. Inc., West Hartford 1, Conn. *Phone*: Adams 3-7561

Billet Heater

Any degree of taper or uniform heating is obtainable from the billet heater.

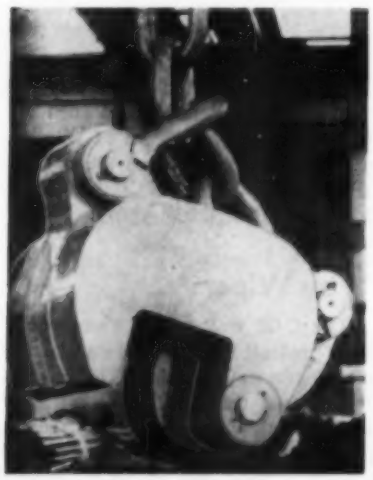
Coils are protected by individually protected water baths. No

shut-down or warm-up time is needed with the unit. Heat is turned on or off instantly. *Write*: Lombard Corp., 639 Wick Ave., Youngstown, O. *Phone*: Riverside 3-2125

Lifting Clamp

This tool made of steel plate will lift a load of 40 tons.

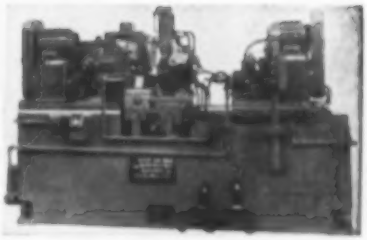
When its jaws are applied to the load, they are relaxed, but as the hoists ascends, they close with a firm gripping action.



The semiautomatic cam action of the serrated jaws makes the grip directly proportional to the load. *Write*: Kensico Mfg. Co. Inc., Mount Kisco, N. Y. *Phone*: 6-6010

Milling Machine

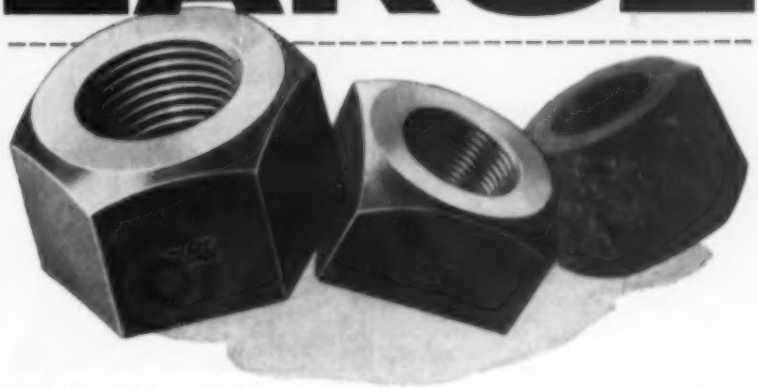
A complete range of steering knuckles for trucks is handled by this universal milling and centering machine. Production averages 90 to 120 pieces an hour. The



cycle is automatic.

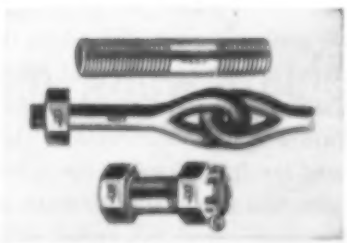
The milling head is a single speed, heavy duty production unit. Hydraulic, quill feed drilling units

LARGE



DYSON FORGED NUTS • BOLTS • BLANKS

This 36-page large fastener catalog contains complete dimensions, specifications and prices on Dyson large forged nuts. Dyson large nuts, bolts and blanks are forged in a modern plant devoted exclusively to large fasteners. Prompt service on special requirements. Adequate Steel Stocks, machining and heat treating facilities.



JOS. Dyson & SONS Inc.

3125 ST CLAIR AVE | CLEVELAND 3 OHIO | HENDERSON 1-6157

THERE'S NO SUBSTITUTE FOR QUALITY

W-T ALKER-TURNER

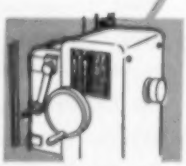
Rugged, rapid Blade Welder optional at extra cost

COMPARE — You'll see that you get a lot more for your money when you buy W-T "Light-Heavyweights"!

You can vary speed from 50 sfm to 4500 sfm while this machine is running!

No time-wasting belt changes! No incorrect speeds! Turn the hand wheel, and you vary speed of this Walker-Turner "LIGHT-HEAVYWEIGHT" 16" Band Saw from 50 to 450 sfm in low range, and from 500 to 4500 sfm in high range—in stepless, smooth variation, while the machine is running.

Gives you the right speed instantly for anything that's cuttable — tough steel, non-ferrous metals, plastics, wood. Ask your Walker-Turner Distributor to show you what this precision-cutting saw will do for you. He's listed under "Tools" in your phone book's Yellow Pages. Or write today for his name, and full information.



DRILL PRESSES, HAND AND POWER FEED — AIR FEED DRILL PRESS ATTACHMENT — RADIAL DRILLS — WOOD AND METAL CUTTING BAND SAWS — TILTING ARBOR SAWS — RADIAL SAWS — JIG SAWS — CUT-OFF SAWS — LATHES — SPINDLE SHAPERS — JOINTERS — BELT AND DISC SURFACERS — FLEXIBLE SHAFT MACHINES

walker-Turner

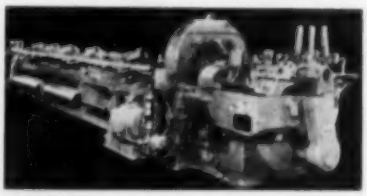
WALKER-TURNER
INCORPORATED
Plainfield, N. J.

NEW PRODUCTS and equipment

are used. *Write*: Machinery Mfg. Division, Motch & Merryweather Machinery Co., 888 E. 70th St., Cleveland 3, O. *Phone*: Utah 1-1515

Canmaking Machine

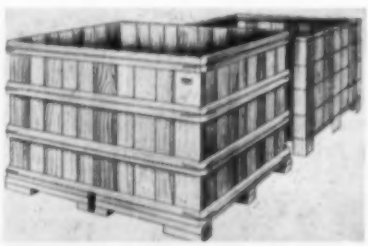
The 501 body maker and soldering machine turns out 400 to 500 can bodies a minute. Sizes range from 2 1/16 to 4¼-in. in diameter and 2¾ to 5¾-in. in height.



All parts that contact can body material are hardened and chrome plated to prevent scratching. *Write*: Baldwin - Lima - Hamilton Corp., 545 N. Third St., Hamilton, O. *Phone*: Hamilton 4-6511

Pallet Boxes

Standardized wire-bound pallet boxes can handle loads up to 3000 lb. Four sizes are available in either regular or open front form.

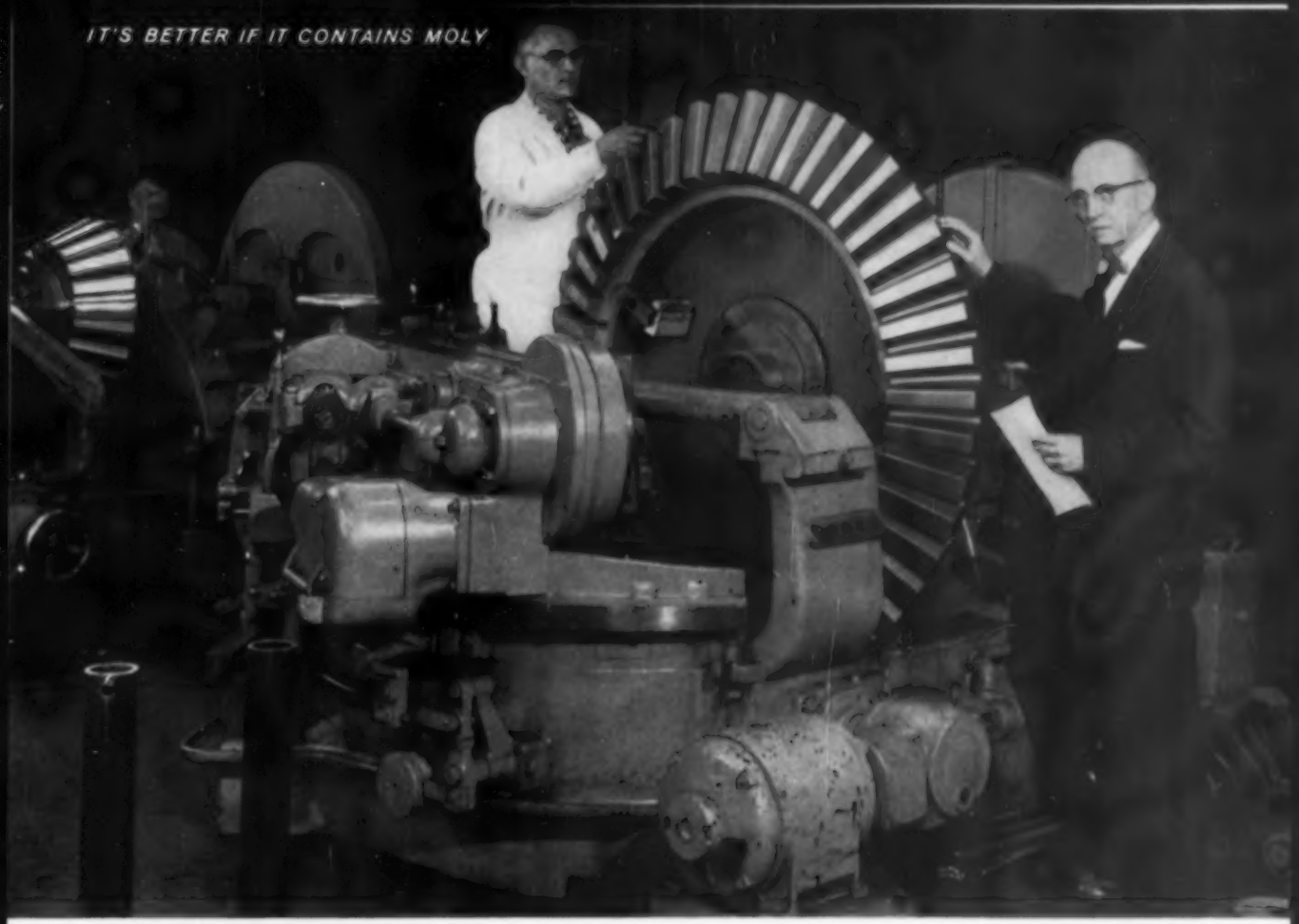


The boxes are dimensioned to fit conveniently into railroad cars or trucks with a minimum of wasted space. *Write*: General Box Co., 1825 Miner St., Des Plaines, Ill. *Phone*: Vanderbilt 4-4181

Way Wipers

The C/R way wiper gives positive protection where metal parts slide over ways in close alignment. It leaves a thin protective oil film while wiping the ways clean. Dirt, chips, fine abrasives, cutting com-

IT'S BETTER IF IT CONTAINS MOLY



E. B. Smiley, Metallurgist for Illinois Gear & Machine Co., looks over setup of large, heavy duty bevel gear made from molybdenum alloy steel casting. This gear has been rough turned, rough cut and heat treated to 269 to 302 Brinell before finish cutting.

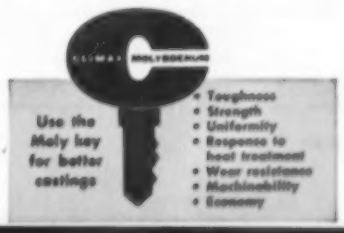
For Strength, Hardness and Machinability gear maker recommends Molybdenum Alloy Steels

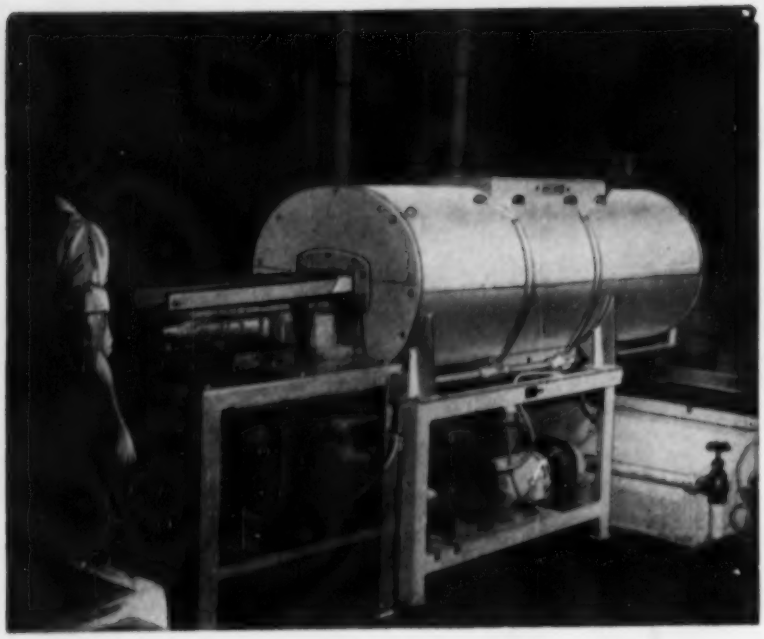
"All of our gears are made to customer specifications, and in many cases these include the use of molybdenum steels," says Mr. Smiley, metallurgist for Illinois Gear & Machine Co. "When our customers specify heat-treated gears of plain carbon steel," Mr. Smiley continues, "we often recommend that they change to 4140 alloy containing molybdenum to achieve high strength and hardenability with good machinability."

Moly steels offer gear users many advantages over carbon steel. Their greater strength and toughness permit the use of smaller weight-saving gears to transmit a given amount of power. Reduced weight and size of gear housings and other components add to the economy of moly steels. And their higher endurance is an important safety factor.

The properties of moly steels are discussed in a new booklet "Moly Steels for Cast Gears". Full technical assistance is also yours for the asking. Write Climax Molybdenum Co., Dept. 3, New York 36, N. Y.

CLIMAX MOLYBDENUM





IBM Improves Heat Treating Quality Cuts Costs With Hevi Duty Shaker Hearth Furnaces

At **IBM** — heat treated parts must meet rigid physical specifications and tolerances. Formerly a liquid cyaniding process was used and production was slow and costly. By using Hevi Duty Shaker Hearth Furnaces, the quality of the work has been improved and production has been increased.

The metallurgists at **IBM** state —

Controlled Case Depth — A uniform case depth of .002" to .015" is obtained. Three zones of temperature control assure an even temperature for the entire length of the hearth plate. The flexibility of dry cyaniding enables our operator to produce a case which is most suitable to the type of steel, shape, and function of the particular part.

Uniform Hardness — is obtained because all parts fall from the hearth into the quench individually. This is especially true of small studs which were formerly dumped from baskets into the quench.

Less Distortion — because in these furnaces the parts are not pushed or packed together. The work is heated and quenched at a rate which minimizes internal stresses and possible warpage. The warpage is less than that experienced with careful handling by former methods.

Clean Bright Surface — is a requirement because the work is flash chromium plated. Washing and cleaning time has been reduced.

The Hevi Duty Shaker Hearth Furnace is fully adjustable to give complete control of heat treating processes such as Hardening, Dry Cyaniding, and Carburizing. Write for Bulletin HD-850 which describes the furnace that assures uniform results on a production basis.

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVI-DUTY ELECTRIC EXCLUSIVELY

DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS

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NEW PRODUCTS and equipment

pounds, even water emulsions, are excluded.

Harmful materials are prevented from being trapped behind the wiping lip. The synthetic rubber wiper comes in 22-in. lengths which are easily cut to fit. *Write*: Chicago Rawhide Mfg. Co., 1267 Elston Ave., Chicago 22, Ill. *Phone*: Brunswick 8-2100

Small Pump

Up to 2 gpm can be pumped by the model 40 pumps. Only nylon fittings and vinyl tubing convey material.

The pump handles a wide variety of chemicals, viscous fluids, slurries and gases. *Write*: Becher Pump Co., 852 Belmont Ave., Chicago 14, Ill. *Phone*: Bittersweet 8-7042

Processing Units

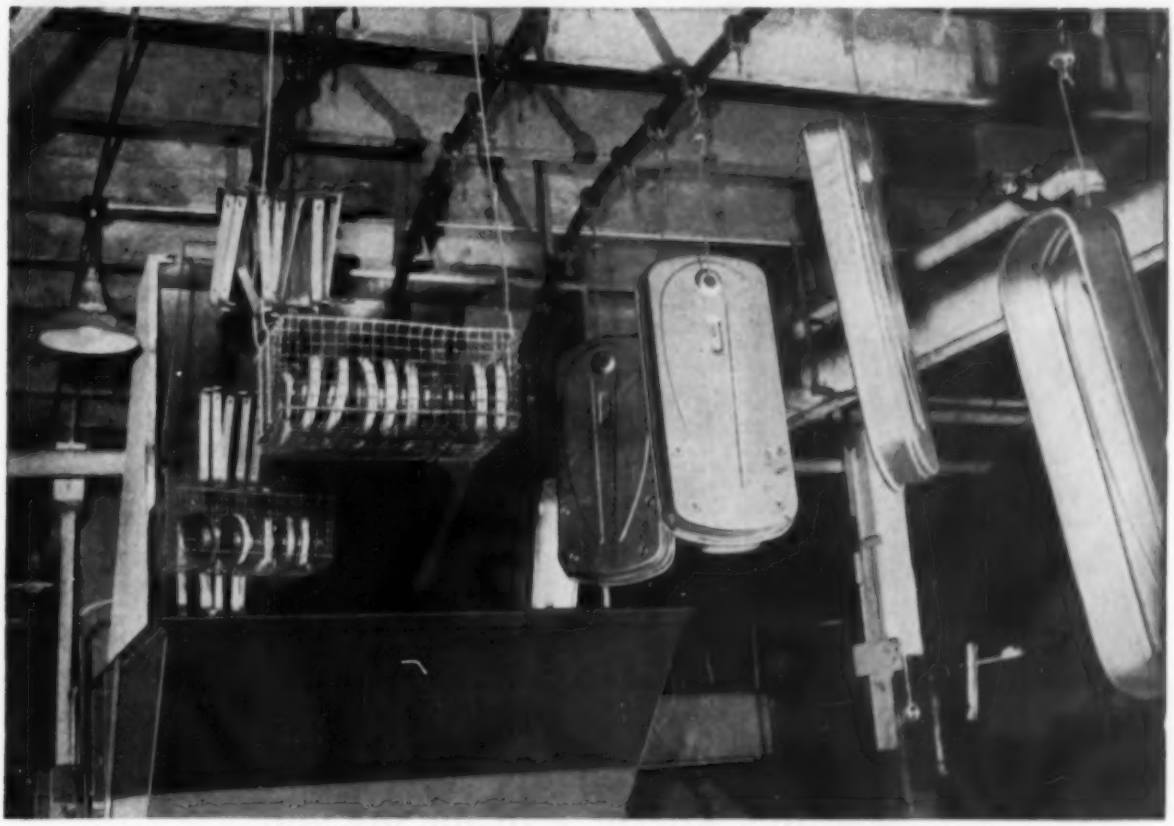
This automatic rotary transfer unit is for bulk handling of assorted parts for chemical treatment.

The equipment can incorporate washing, rinsing, pickling, phosphate coating, application of lubricants, drying and other treatments.

Work being processed is in con-

Dow . . . industry's most complete line of chlorinated solvents

DOW



Higher boiling point of DOW PERCHLOROETHYLENE gives parts longer, more thorough cleaning action before parts' temperatures reach that of the vapor. This is a particular saving when tough contaminants like waxes and buffing compounds are being removed.

It's a smooth, no-repeat operation

when you're running on highly stable

DOW PERCHLOROETHYLENE

Continuous monorail or cross rod conveyor units need an exceptionally stable solvent to deliver "one stop" vapor degreasing. The major value of these high-speed units is lost if improper solvent fails to degrease parts thoroughly, forcing reruns.

High-boiling DOW PERCHLOROETHYLENE answers this problem with stability to spare. You can't find a solvent with greater resistance to thermal breakdown or deterioration from light and oxygen. This stability *plus* prevents decomposition of DOW PERCHLOROETHYLENE that would harm the units or the load. And this solvent's greater vapor density holds vapor loss far lower.

Contact your local Dow distributor *today* for a profitable fill-in on how you could use this efficient, safe vapor degreasing solvent. You'll want to ask him about "work horse" DOW TRICHLOROETHYLENE, METHYLENE CHLORIDE and sensational, cold-cleaning CHLOROTHENE*, too. For detailed technical information on any of these solvents, just drop a line to THE DOW CHEMICAL COMPANY, Dept. S942B1, Midland, Michigan.

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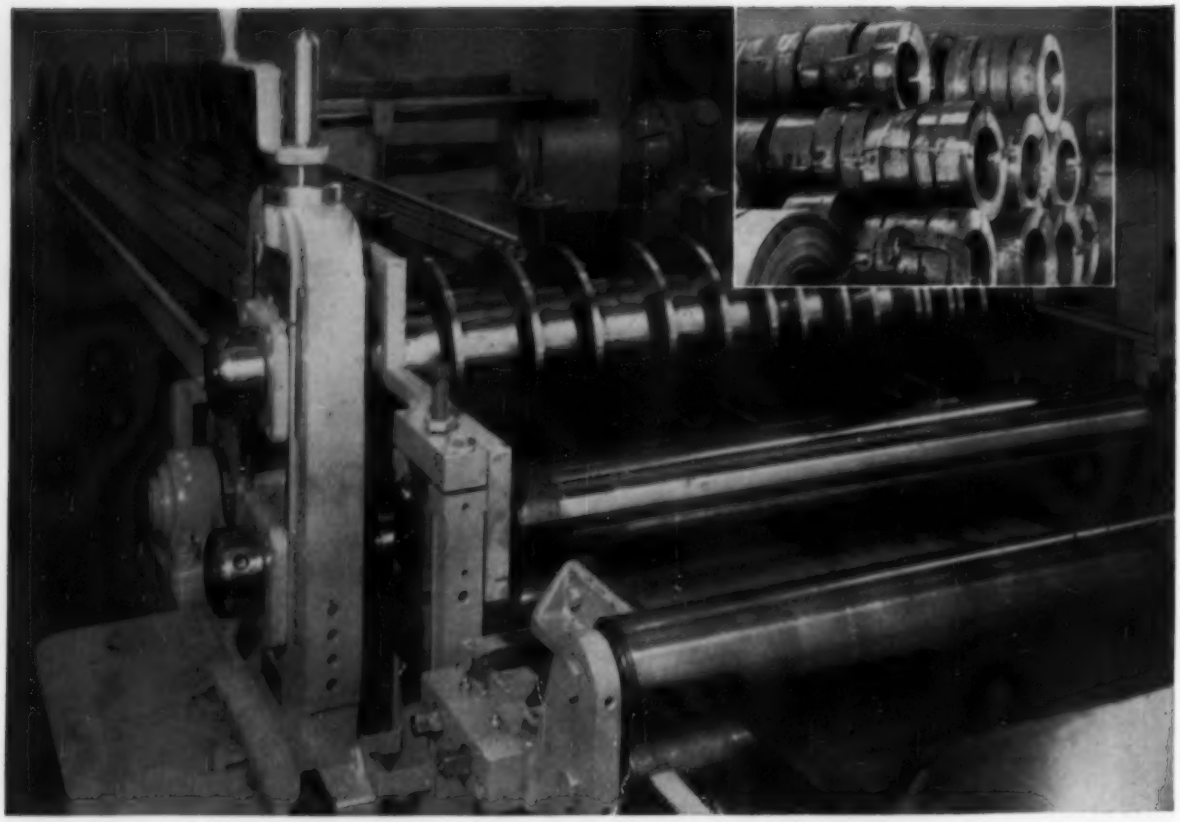

...these things and others, too, a Yoder Slitter can do for you...

By doing your own slitting, you may easily save $12,000 or more per year in slitting cost alone, on requirements as low as 100 tons per month.

But don't make the mistake of thinking this is the only saving or advantage enjoyed. Many owners realize equally important savings by being able to buy standard width coils competitively, from more numerous sources of supply—wherever they can get the best price and quality. Much quicker deliveries are also obtainable in this way.

Inventory requirements, too, are greatly reduced and production planning simplified because, from a relatively small stock of mill-width coils or sheets, you can meet expected and unexpected needs for slit strands in a few hours.

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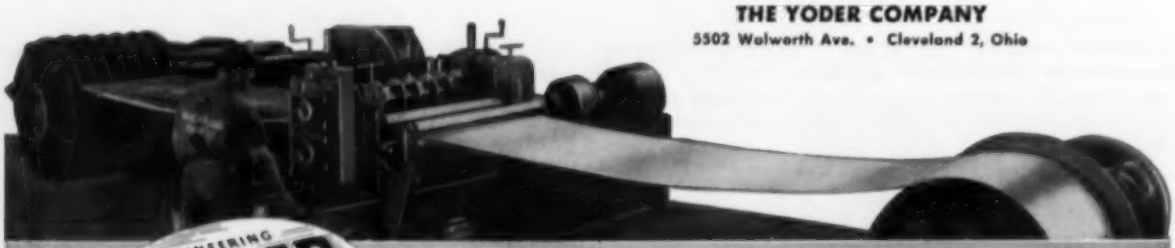

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COLD ROLL FORMING MACHINES

ELECTRIC-WELD PIPE AND TUBE MILLS

stant motion. Parts are oriented for drainage as they transfer from drum to drum. All drums rotate on heavy shafting, mounted above the solution tanks. *Write*: Detrex Chemical Industries Inc., Detroit, Mich.

Degreaser

The OP3 degreaser cleans parts that have a tendency to nest or pack, or parts with recesses that are difficult to penetrate with a hand spray.

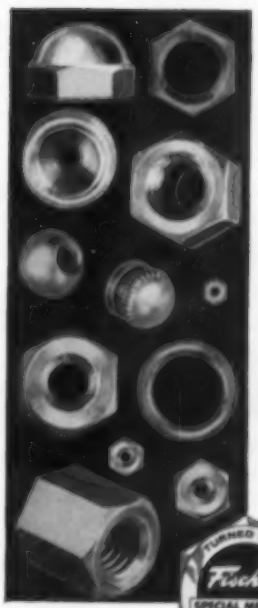
The cleaning cycle is based on a consecutive boiling solvent, warm liquid and vapor dip. Both trichlorethylene and perchlorethylene are recommended for the machine. *Write*: Circo Equipment Co., 51 Terminal Ave., Clark (Rahway), N. J. *Phone*: Fulton 8-8600

Carbide Tool Testing

Surface conditioning with liquid honing equipment is a positive method of detecting cracks and other imperfections in new and reground carbide tools.

Abrasive and hydraulic action forces fine sintered material out of minute cracks to make them obvious defects during visual inspection.

Liquid honing removes burrs and grind lines and produces a satin matte finish without dimensional change. *Write*: Vapor Blast Mfg. Co., 3025 W. Atkinson Ave., Milwaukee 16, Wis. *Phone*: Custer 3-6500



Special and odd size nuts . . . brass or aluminum . . . are "duck soup" for Fischer.

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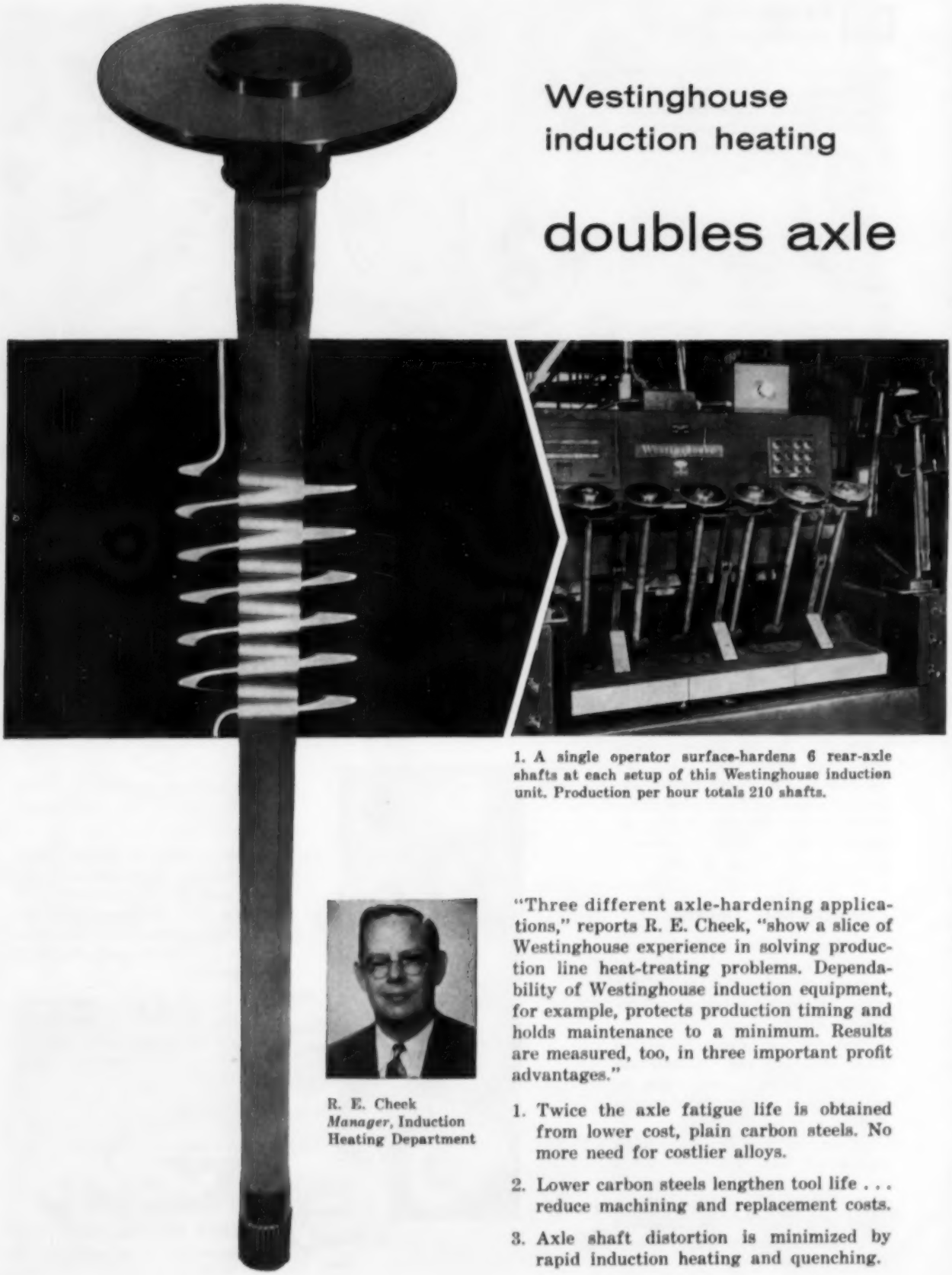
C 356-F5

Westinghouse induction heating doubles axle



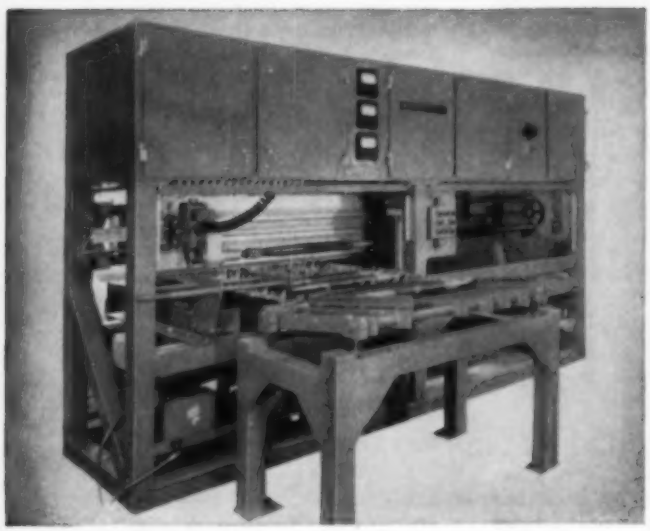
1. A single operator surface-hardens 6 rear-axle shafts at each setup of this Westinghouse induction unit. Production per hour totals 210 shafts.

R. E. Cheek
Manager, Induction Heating Department

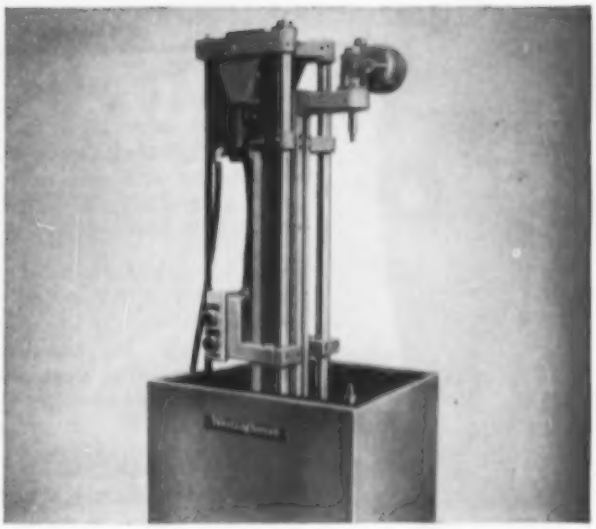
"Three different axle-hardening applications," reports R. E. Cheek, "show a slice of Westinghouse experience in solving production line heat-treating problems. Dependability of Westinghouse induction equipment, for example, protects production timing and holds maintenance to a minimum. Results are measured, too, in three important profit advantages."

1. Twice the axle fatigue life is obtained from lower cost, plain carbon steels. No more need for costlier alloys.
2. Lower carbon steels lengthen tool life . . . reduce machining and replacement costs.
3. Axle shaft distortion is minimized by rapid induction heating and quenching.

fatigue strength . . . lowers cost



2. As many as 33 axle shafts up to 42 inches long and weighing up to 100 lbs. are surface-hardened by this Westinghouse induction equipment.



3. Westinghouse general-purpose induction scanner handles shafts up to 30 inches long, 80 lbs. weight, for surface-hardening and quenching.

Many other factors, such as savings in floor space, rapid start-up, and cooler more productive working conditions add to the high efficiency of each installation.

A profit return for you? Westinghouse induction-heating experience can show you production problems turned into profitable solutions for hardening, annealing, joining, or forging. Why not call on your local Westinghouse industrial heating sales engineer? He'll bring you expert problem solving and complete service. Westinghouse Electric Corporation, Industrial Heating Division, Meadville, Penna. J-10455

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NEW Literature

Write directly to the company for a copy

Powdered Metal Products

Engineering manual, E-56, 52 pages, gives properties of self-lubricating bearings, finished machine parts and permanent metal filters. Amplex Division, Chrysler Corp., Detroit 31, Mich.

Extrusions

Bulletin TB-413, 6 pages, lists ferrous and nonferrous alloys which are extruded into tubing, solids and shapes. Tubular Products Division, Babcock & Wilcox Co., Beaver Falls, Pa.

Hydraulic Pump-Motor

Bulletin G-112, 4 pages, describes a unit capable of 2000 psi operating pressure when driven by a standard 1800 rpm motor. Gerotor May Corp., Box 86, Baltimore 3, Md.

Welding Head Manipulator

Specifications of a mast-type automatic welding head manipulator are given in bulletin R-1700-B18, 4 pages. Positioning Equipment Division, Worthington Corp., Plainfield, N. J.

Fork Truck

A 3000-lb capacity electric truck is described in a 4-page folder. Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, O.

Motor Scraper

Design, engineering, construction and operating features of a motor scraper are pictured in bulletin MS-1105, 16 pages. Construction Machinery Division, Tractor Group, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Alloy Steel Tubing

Bulletin TDC-184, 4 pages, presents technical information on 12 widely used alloy steels of the 4100 series. Tubular Products Division, Babcock & Wilcox Co., Beaver Falls, Pa.

Feeds and Speeds

A chart lists safe feeds and speeds for high speed drills for use in cast iron, bronze, brass, drop forgings, alloy steel and annealed tool steel. Chicago-Latrobe Twist Drill Works, 411 W. Ontario St., Chicago 10, Ill.

Rust Prevention

A selector chart gives protective properties, physical properties and

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24 years now

Photo courtesy Sun Shipbuilding & Dry Dock Company

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The furnace that PAID FOR ITSELF MANY TIMES OVER

Still lined with its original B&W Insulating Firebrick after 15 years of normalizing and stress-relieving service, this furnace is giving exceptional performance. Despite the added strain of the rigorous war years, the 80,000 B&W IFB used to line sides, ends and arch have required no appreciable maintenance!

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NEW LITERATURE

coverage of rust preventive products for spare parts, tools and machines. Daubert Chemical Co., 333 N. Michigan Ave., Chicago 1, Ill.

Hose and Fittings

Bulletin 174, 12 pages, tabulates hose, fittings, socketless fittings and kits and self-sealing couplings. Aeroquip Corp., Jackson, Mich.

Surface Plate Equipment

Bulletin 838-V, 8 pages, presents surface plates, layout plates, angle plates, V-blocks, box parallels, universal right angle irons and work benches. Challenge Machinery Co., Grand Haven, Mich.

Electrolytic Grinding

Bulletin 300, 4 pages, outlines procedures in adapting standard grinders to electrolytic grinding equipment. Anocut Engineering Co., 631 W. Washington Blvd., Chicago 6, Ill.

Transmissions

Six models of planetary gear transmissions for road building machinery, lift trucks and similar equipment are described in a booklet. American Gear & Mfg. Co., Lemont, Ill.

Thermocouples

Thermocouple assemblies, their accessories and pressure sealing glands are described in bulletin 1556, 28 pages. Conax Corp., 7811 Sheridan Drive, Buffalo 21, N. Y.

Blind Rivet Gun

All sizes of blind rivets made of aluminum, steel and Monel are set by a gun described in bulletin TL-117. Townsend Co., P. O. Box 237-Z, New Brighton, Pa.

Copper Alloys

Refractory copper-base alloys, phosphor bronze, nickel silver, beryllium copper and cupro nickel, are specified in a 36-page booklet. Riverside Metal Division, H. K. Porter Company Inc., Riverside, N. J.

Hollow Shaft Motors

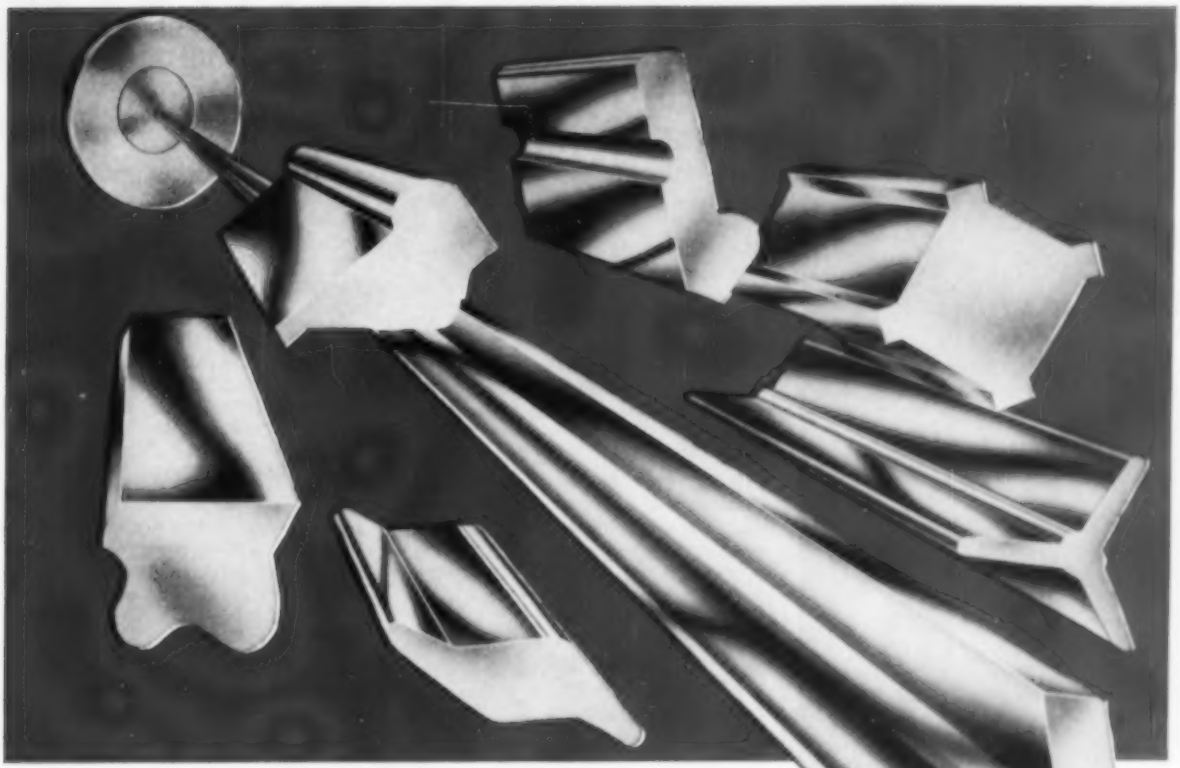
Vertical hollow shaft motors, 7½ to 30 hp, are presented in a 6-page bulletin, GEA-6521. General Electric Co., Schenectady 5, N. Y.

Gas Tractors

Four 2-page bulletins describe tractors with drawbar pulls from 3000 to 5000 lb. Mercury Mfg. Co., 4044 S. Halsted St., Chicago 9, Ill.

Iron Castings

Two 4-page bulletins present technical information and case histories



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NEW LITERATURE

of the use of molybdenum in gray iron castings. Department L, Climax Molybdenum Co., 500 Fifth Ave., New York 36, N. Y.

Fluid-Tight Rivets

Bulletin Pl-5, 6 pages, presents a self-sealing rivet. Pastushin Industries Inc., 5651 W. Century Blvd., Los Angeles 45, Calif.

Industrial Trailers

Eight trailers with capacities from 2 to 30 tons are covered in four 2-page bulletins. Mercury Mfg. Co., 4044 S. Halsted St., Chicago 9, Ill.

Can Machinery

Strip feed presses, curlers and stackers for medium and high speed can lines are described in catalog 36B, section 2, 8 pages. E. W. Bliss Co., 50 Church St., New York 7, N. Y.

Press Brakes

Bulletin 2010-J, 8 pages, gives specifications of a line of press brakes. Cleveland Crane & Engineering Co., 1042 E. 289th St., Wickliffe, O.

Coatings

Bulletin SP-1, 4 pages, describes a sprayable coating for protection against acids, alkalies, salt solutions and complex chemical compounds. Metal & Thermit Corp., Rahway, N. J.

Power Control

Clutches, brakes, couplings, power take-offs, rotor seals, quick release valves and high speed controls and their applications are presented in 36-page bulletin 500-A. Fawick Airflex Division, Fawick Corp., 9919 Clinton Rd., Cleveland 11, O.

Koroseal Pipe

Installation procedures, uses and properties of rigid Koroseal pipe are covered in bulletin 10050, 8 pages. Plastic Products, B. F. Goodrich Co., Marietta, O.

Copper Tape

Data sheet TWC-101 describes ultrathin copper (thicknesses are as low as 0.00017-in.) for wafer-type coils. American Silver Co. Inc., 36-07 Prince St., Flushing 54, N. Y.

Flux Selection

A 4-page bulletin tells you how to select corrosive and noncorrosive fluxes. Anchor Metal Co. Inc., 244 Boerum St., Brooklyn 6, N. Y.

Abrasive Finishing

A 10-page bulletin presents case histories of coated abrasive applications in the appliance industry. Department F6-189, Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.

Welding Equipment

Regulators and torches for heating, soldering, welding and cutting are illustrated in a 4-page bulletin. Dockson Corp., 3839 Wabash Ave., Detroit 8, Mich.

Torque Converters

Single stage hydraulic torque converters for the transmission of 100 to 1000 hp to industrial machinery are presented in bulletin 468, 6 pages. National Supply Co., 2 Gateway Center, Pittsburgh, Pa.

Aluminum Handbook

Data on aluminum alloys and mill products are presented in the 140 tables of this 176-page book. Aluminum Co. of America, 781 Alcoa Bldg., Pittsburgh 19, Pa.

Steel Erection

A 24-page bulletin illustrates bridges, buildings, schools and hospitals in the structural steel erection stage. Allied Structural Steel Companies, Suite 1791, 20 N. Wacker Dr., Chicago 6, Ill.

Fasteners

Bulletin 11B, 12 pages, lists a complete range of self-locking bolts and screws, setscrews, hex nuts, threaded inserts, clinch nuts and cap nuts. Nylok Corp., 475 Fifth Ave., New York 17, N. Y.

Pneumatic Tube Systems

A 36-page catalog describes systems for handling blueprints, tickets, tags, books, complete files and hot or cold samples in steel mills. Grover Co., 25525 W. Eight Mile Rd., Detroit 19, Mich.

Setscrews

Standard and special setscrews for increased holding power and resistance to vibration, tampering, chemicals or heat are presented in bulletin 21, 28 pages. Set Screw & Mfg. Co., Bartlett, Ill.

Tool Bits

An 8-page stock list covers tool bits, drill rod and ground flat stock. Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.

Brazing Rod

Bulletin W-31 describes a low fuming, high strength nickel-brass rod for oxyacetylene brazing and braze welding. Ampco Metal Inc., 1745 S. 38th St., Milwaukee 46, Wis.

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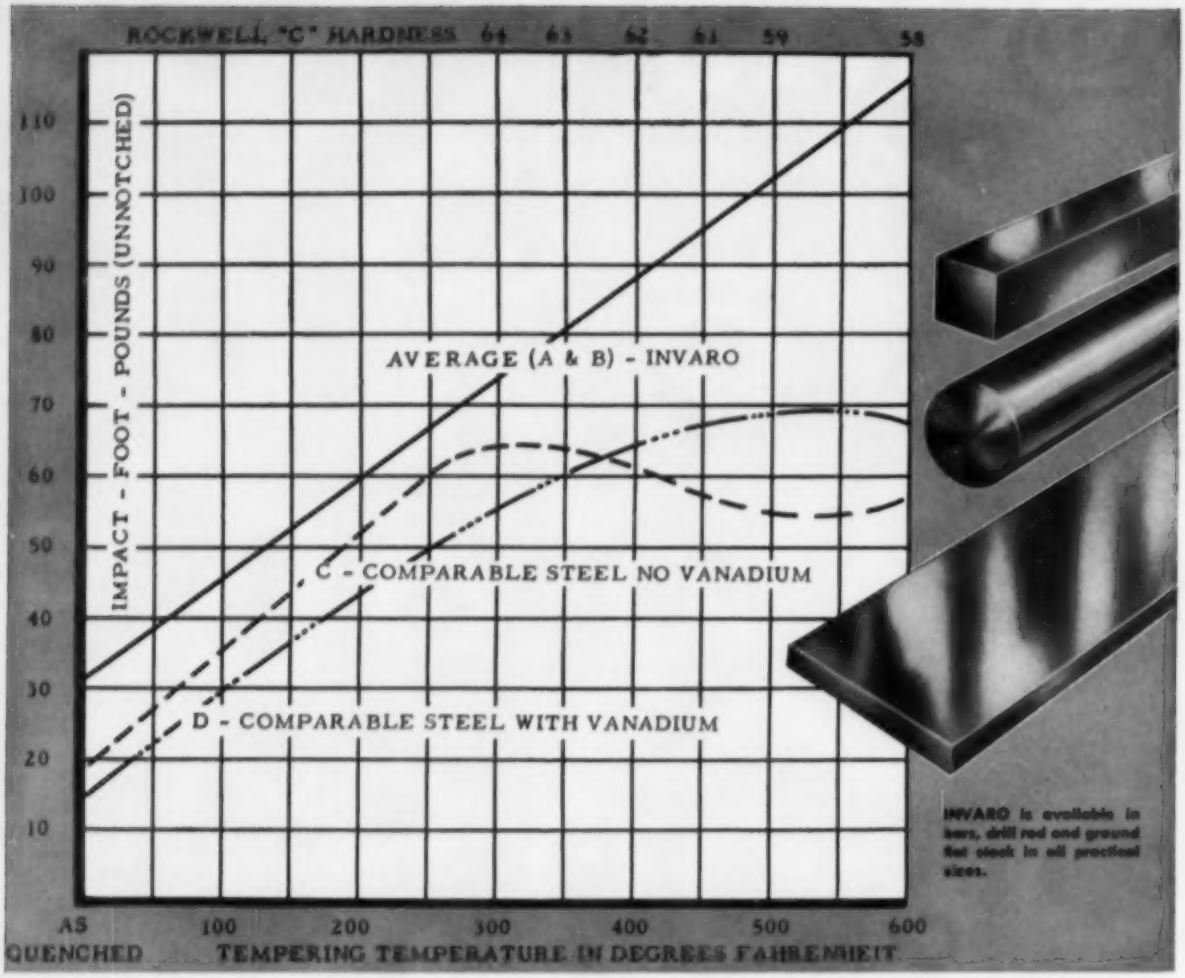

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of leading comparable oil-hardening tool and die steels

When the toughness of a tool and die steel is the critical factor of selection, Firth Sterling INVARO is the *toughest* of the tough! That's not just an opinion but a *fact.* Undeniable proof is established by the A.S.T.M. Izod Impact Test, results of which are graphically shown above, comparing steels both with and without vanadium.

INVARO shows a superior toughness in *all* ranges of temperature from a minimum advantage of about 12% to as much as 100% greater! This marked superiority is the result of Firth Sterling's advanced metallurgical practices combined with 67 years of experience in the art of making specialty steels.

Yes, when you want *toughness* in your tools and dies, combined with uniformity, excellent hardening properties and safety in heat treating . . . specify INVARO.

Chemical Analysis	*All test samples were machined from half-inch annealed bar stock.*							
	C	Si	Mn	S	P	W	V	Cr
Invaro A	.88	.34	1.22	.010	.020	.49	.19	.50
Invaro B	.94	.25	1.20	.014	.013	.53	.22	.49
Comp. C	.90	.33	1.24	.011	.025	.50	—	.55
Comp. D	.95	.34	1.27	.010	.020	.50	.21	.59

Firth Sterling

R-320

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Chromium Carbides
High Temperature Cermets
Zirconium

STEEL

September 10, 1956

Market Outlook

STEEL INGOT production, now at 98 per cent of capacity, is a good indicator of the strength of demand. Why is demand this high?

Some of the high rate of steel production is to satisfy current consumption, but a substantial part of it comes from three other factors: 1. Order backlogs. 2. Need for steel for new models of products. 3. Buying for inventory adjustment.

CONFIDENT— While these three factors do little to reflect a trend in current steel consumption, they do demonstrate confidence in the future. Buying of steel for new models not yet sold shows belief they will sell. Buying of steel for inventory adjustment, or just to have steel on hand, exhibits confidence that the steel will be needed.

WATCH OUT— The auto industry has come into the steel market in only a small way in preparation for its new models, but if it jumps in heavily, a real squeeze on supply will develop. The auto industry laid in a large tonnage of steel before the increase in steel prices.

FAST RECOVERY— Even without the auto industry exerting strong demand, steel ingot output has recovered unexpectedly soon from the steelworkers' strike. The 98 per cent of capacity rate in the week ended Sept. 9 is a 1 point increase over that of the preceding week. Helping the steel industry recover so rapidly is the additional capacity that has come into operation since the first of the year.

A revived demand from the automobile industry would call heavily on the supply of cold-rolled carbon steel sheets. Around 40 per cent of the weight of each auto is cold-rolled sheets. A loud call for cold-rolled sheets would make hot-rolled sheets even more difficult to get than they now are. The hot-rolled product takes second place in periods of strong demand for cold rolled.

TIGHT SPOTS— Other forms of finished steel which are in tight supply are structural shapes, heavy plates, oil country tubular goods, with hot-rolled carbon bars (particularly the large ones) rapidly joining them.

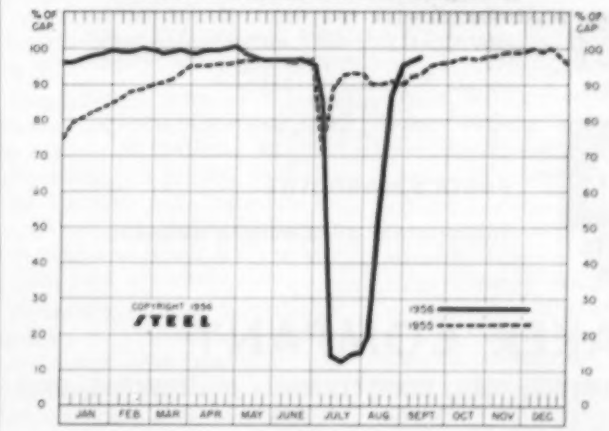
Producers of structurals, plates and oil country tubular goods are booked as far ahead as they will accept orders.

BOOKED UP— Promising continued demand for structurals and plates are the order books of fabricators. One bridge fabricating shop, for example, is booked into 1958. A further bulge in demand for bridges and the stuff they are made of—structurals and plates—should come next year from the federal aid highway construction program.

Tightening of demand for sheet is squeezing out production of strip mill plate. While the latter can be used only for certain purposes, it does take some of the pressure off the conventional plate mills.

PRICES— Steel prices have become pretty well stabilized, now that most of the adjustments stemming from the new labor contract have been completed. In the week ended Sept. 5, STEEL's price composite on finished steel remained at $137.75 a net ton. Also unchanged is STEEL's price composite on steelmaking scrap at $58.83 a gross ton—the all-time high.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Sept. 9	Change	Same Week 1955	Same Week 1954
Pittsburgh	98.5	+ 2.5*	94	65.5
Chicago	99.5	+ 1.0*	97.5	67
Mid-Atlantic	97.0	+ 1.0	94	59
Youngstown	105.0	+ 10.0	98	60
Wheeling	98.0	+ 0.5	93.5	70
Cleveland	100.5	— 3.5*	94.5	68
Buffalo	107.0	+ 2.0	105	56
Birmingham	96.0	+ 2.5	93.5	68
New England	90.0	0	81	50
Cincinnati	90.0	+ 21.5	89	52
St. Louis	89.0	0	84.5	59.5
Detroit	91.2	— 1.3	87.5	63.5
Western	94.0	0	103	78
National Rate	98.0	+ 1	93.5	63.5

INGOT PRODUCTION‡

	Week Ended Sept. 9	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	151.2†	145.7	88.1	140.9
NET TONS (In thousands)	2,429†	2,389	1,415	2,264

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 93 Technical Outlook—p. 139

FAMOUS FIRSTS IN THE IRON & STEEL INDUSTRY

SAMUEL HIGLEY—AMERICA'S FIRST STEEL MAKER

The credit of producing the first steel in America goes to Samuel Higley, of Simsburg, Connecticut. In the Connecticut State Library there is a certificate signed by two blacksmiths . . . Phelps and Drake, stating that Higley took specially shaped wrought iron from them and later returned with the iron refined into steel. This certificate is dated May 7, 1728, but it has been established that Higley's first experiments bore fruit in or around 1725. Based on the testimony on this certificate Higley and his associate Dewey were awarded patent rights to run for ten years.

It is believed Higley made his steel by the cementation process. In this process charcoal was packed around wrought iron bars and the whole mass was heated in a closed furnace for a week or more. The longer the iron was heated, the more carbon it absorbed from the charcoal. This "blister-steel", or rather an iron core with a steel surface, was poor in quality by modern standards, but it was the beginning of one of America's greatest industries.

The J. E. Baker Company discovered years ago how to prepare better dolomite. The results of constant experimentation developed BAKER'S MAGDOLITE, the original dead-burned dolomite. Today BAKER'S MAGDOLITE delivers more uniform ingots with less defective production material. Try BAKER'S MAGDOLITE today. It is always 5 ways better: Composition, Preparation, Strength, Economy, Quality.

3-55

ANOTHER FAMOUS FIRST

JEBCO PRODUCTS SINCE 1889

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THE J. E. BAKER COMPANY

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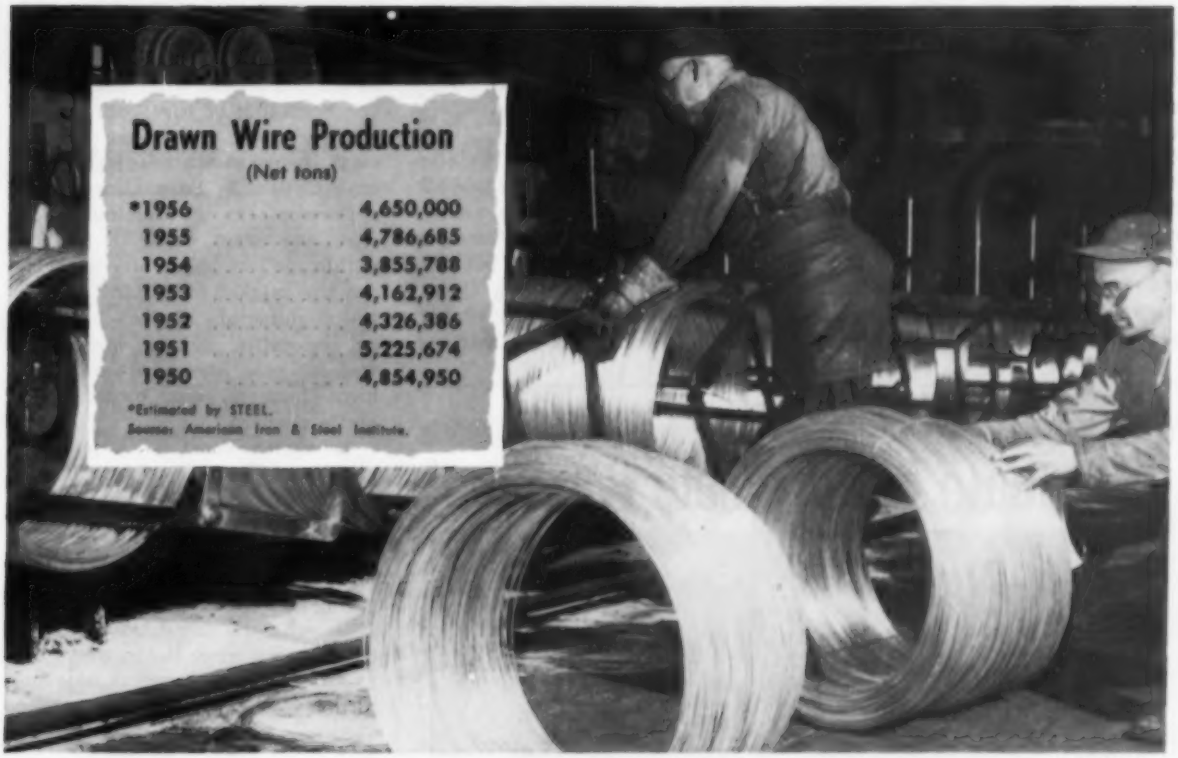


Drawn Wire Production
(Net tons)

*1956	4,650,000
1955	4,786,685
1954	3,855,788
1953	4,162,912
1952	4,326,386
1951	5,225,674
1950	4,854,950

*Estimated by STEEL.
Source: American Iron & Steel Institute.

U. S. Steel Corp.

Wiremakers See Uptrend

Steel strike ruled out chances for a record this year. But with labor peace and expanding markets, 1957 shapes up as the best year in industry's history

VOLUME increases in most of the more than 160,000 uses of wire are expected in 1957. With production facilities geared to meet the bulges in demand, it could be the best year the wire industry has ever had.

Even though some of this increased usage will be felt this year, the chances of bettering the production level hit in 1955 were shot when the steel mills were idle for six weeks (see table above). Drawn wire consumes about 3.7 per cent of total steel shipments.

Versatility — It is claimed that the metalworking industry can do more things with wire than any other metal product. Including sizes, physical and chemical properties, shapes and finishes, there are well over 1 million specifications for wire—nobody knows the exact number.

Most industrial uses are increasing steadily, and the outlook for heavier tonnages in new and developing consumer markets is bright. Wire producers are aggressively seeking and finding new markets, especially since the advent of the tungsten die.

Good Timing—Sales of high carbon, high tensile wire for prestressed concrete in bridges and building panels are mounting. Low carbon wire consumption for reinforcing, including concrete pipe coils, is double that of last year. In this regard, the severe shortage and extended deliveries of fabricated structural steel couldn't have developed at a better time for the wire industry. Only recently, research has made it possible to lengthen bridge spans which use prestressed concrete. (A 172 ft multiple girder structure spans the Connecticut river near Hartford, Conn.) Longer and stronger reinforcing strands of wire will be required.

Expanded federal aid highway construction will bolster wire mesh reinforcing from 185,000 tons this year to 230,000 tons in 1957. By 1969, wire mesh used in highway construction will have reached 3,325,000 tons, hitting a peak of 265,000 tons annually for about eight years. Steel wire for reinforcement of 45 million tons of concrete pipe will be required, and an estimated 1.9 million tons of wire will go into guard rails, rope and strand fence.

Fasteners Growing—For threaded fasteners (wood screws and nails excluded) about 1 million tons of steel are required annually. Bolts and other fasteners fabricated by cold heading from wire 0.70 to 0.75 in. diameter are adding

tonnage, with the trend toward even larger sizes.

More wire will be used for reinforcing of mechanical rubber goods, belts and tires. Most of this is brass-bronze plated for a better bond. About 50,000 tons—mostly 0.70 carbon—are used annually for tire beads. Wire cords, widely accepted for truck and heavy duty tires, are beginning to move into the higher volume car tire field. Another new and growing use of wire in truck tires is a steel wire shield between tread and carcass. "We believe these tires are the safest that have been made to date," says Seldon Fisher, director of tire research, United States Rubber Co., New York.

Wider Markets — With heavier automotive demand, springs will require more wire in months ahead. Spring volume in the automobile industry has been down, but net sales of Associated Spring Corp., Bristol, Conn., are slightly higher than they were. Broader markets pushed first half sales 4.4 per cent ahead of those in the corresponding period last year. "Our backlog of unfilled orders, while down from the beginning of the year, is only slightly under the volume we had on the books at this time last year," says Carlyle F. Barnes, president.

Development of aluminum clad wire (see STEEL, June 11, p. 175) within the last couple of years widens the market for coated wire in the manufacture of such products as decorative grilles, lampshade frames, pole line hardware, garment hangers, box binding and bottle openers.

Consumer Boost — Population growth alone assures wiremakers of an ever-expanding market in many consumer goods. About 375,000 tons of steel are required every year for bedding—mostly spiral spring coils. This figure will rise in 1957, with the trend toward more coils per mattress. Bobby pins take 12,500 tons of high carbon wire annually. Consumption has increased 2500 tons in the last five years, and will be up again next year.

One sober note is struck by the aircraft industry. The greater use of jet engines will reduce the demand for valve spring wire in reciprocating engines. The trend in the auto industry could be in the same direction if the gas turbine ever takes over. But wire producers are too busy trying to keep up with current business to lose much sleep over such matters.

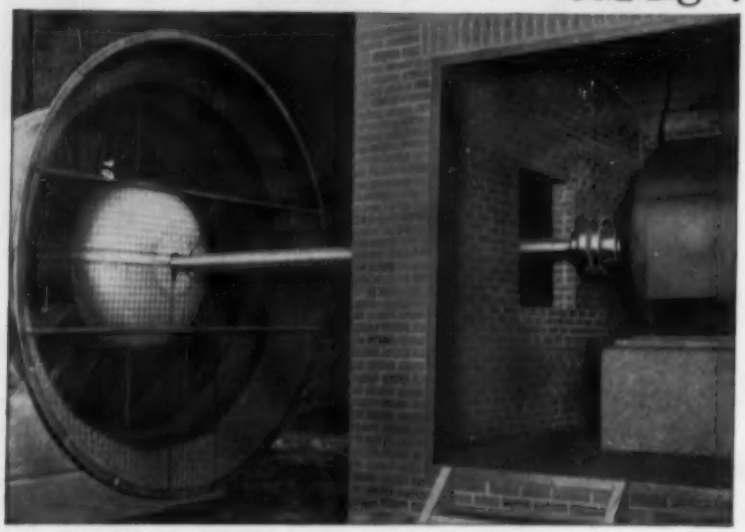
Stainless Sets Hot Pace

Stainless steel producers set a record first-half pace this year. They turned out 614,291 net tons, compared with 590,921 tons of stainless and heat resisting steel during last year's first half. Second half, 1955, production was 600,256 tons.

Type 430 stainless continues to be the biggest item with 129,913 tons, followed by type 302 with 108,350 tons. Types 201 and 202 (new ones) accounted for 9677 tons. In all of 1955, they amounted to only 1886 tons.

Despite the nickel shortage, the 300 series and other nickel bearing steels continue to increase in tonnage. In the first half of 1956, the total was 370,332 tons compared with 324,780 tons in the

Eliminate Intermediate Bearings!



By using Thomas Flexible Couplings on long, unsupported shafts, intermediate bearings are eliminated. Thomas engineers tubular shafts free from lateral whip.

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Thomas floating shaft flexible couplings are recommended for machine and marine drives, printing presses, paper and cement mills, cooling towers, diesel engines, pumps, compressors, and many other uses.

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3. Smooth Continuous Drive with Constant Rotational Velocity
4. Visual Inspection in Operation
5. Original Balance for Life

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THOMAS FLEXIBLE COUPLING COMPANY
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first half of last year and 323,381 tons in the second half, according to American Iron & Steel Institute figures.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 219 & 220

Most producers of hot and cold-rolled sheets have blanked out September and October, and part of November, in an effort to become current on delivery promises. One seller appears to be in almost as bad a position on galvanized sheets, although, in general, the supply of galvanized appears adequate. Shipments against new orders for enameling stock and low silicon sheets can be had in late October and early November.

In the Midwest, one large interest reports there are approximately five weeks of production open for the fourth quarter. This interest opened its books for that contracting position last week.

Hot-rolled sheet supply is tight in the Midwest where most mill executives think the situation will worsen before it gets better. Wide sheets, 48 in. and over, are more critical than the narrower sizes. Cold-rolled sheet supply appears ample at the moment, but there are indications that this grade might tighten up by the middle or end of the quarter. Auto activity holds the key. Buyers however, are not concerned about cold rolled like they are about hot-rolled sheet prospects.

With excess inventories of hot and cold sheets reduced and the prospects for increasing shipments this fall, consumers in the East are inquiring more actively for tonnage. Also stimulating inquiry is the fact that most of the mills are unable to accept new commitments before mid-November. Locally, hot sheets are in greater demand than cold rolled, but buyers of cold rolled are accepting all the tonnage the mills have to offer and in most cases would like to have more. Most of the specialties are not in as active demand as they were a year ago, but producers expect order books to be comfortably filled by the end of this month.

Demand for cold-rolled sheets from the auto makers for September is not too strong, but a different situation is expected next month. An indication of the intensive demand for hot-rolled sheets is the disappearance of light-gage plates in sheet mill production schedules.

Steel Bars . . .

Bar Prices, Page 218

Demand for hot-rolled carbon bars is reported picking up. Consumers have worked off excess inventories on hand at the beginning of the steel strike in July and are now showing concern for their fourth quarter supplies.

Most barmakers will have substantial carry-overs going into the fourth quarter and will have possibly less than six weeks production to devote to new tonnage. One leading interest doubts it will have a month's production available. In general, it looks like hot bar producers will be unable to devote more than half their fourth quarter

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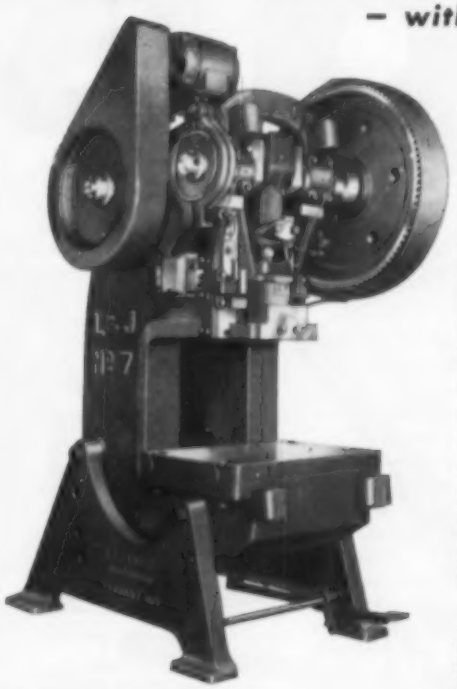

This new press will give you greater production at lower cost. Its alloy iron frame has exceptional rigidity which holds deflection to a minimum and gives closer tolerances, greater uniformity and longer die life. Accuracy is also obtained through adjustable gibs of extra length. The rugged ram adjusting screw has buttress threads and replaceable hard bronze seat. Air clutch optional. Geared and non-geared models.

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SPECIFICATIONS

Capacity — 75 tons. **Standard Stroke** — 4". **Maximum Stroke** (to order) — 8". **Strokes** per minute —42 (non-geared type 85). **Throat Depth** center of ram to frame—13½". **Die Space*** —14" to 22". **Bolster Plate Area**—36" x 26".

* bed to ram, standard stroke down, adj. up.

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Photo courtesy Pacific Tube Company, Los Angeles

Now, available L.P.G.—diesel or gasoline-electric powered in capacities from 2 to 15 tons. Available on long term lease arrangement, too.

output to new orders.

Shipments against old orders still leave buyers with unbalanced inventories. Most producers of hot-rolled alloy bars can do a reasonably good job meeting requirements, with November tonnage available for new orders, even late October in some instances. Cold-drawn bar demand is moderately strong, with deliveries depending upon the availability of hot stock.

Demand from the farm implement industry is still light, midwest barmakers report. Inventories of completed equipment seem to be large enough to take care of increased orders. Any increase in demand for steel on the part of the farm equipment builders could bring about a tight bar market later this year.

Plates . . .

Plate Prices, Page 218

The stringency in plate supply continues. Consumers are in receipt of more tonnage now that mill operations are back to prestrike levels, but requirements are still greatly in excess of supply, and this situation will likely continue well into next spring.

Most mills will be unable to devote more than a month's production in the fourth quarter to new commitments. Tanks, line pipe and heavy machinery are consuming large tonnages—also railroad cars, though currently there is relatively little new car buying.

Ship needs are expanding. The largest in the way of new ship awards involves three 60,000-ton tankers to be built by the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., for the Barracuda Tanker Corp. These will be the largest tankers ever built in the U. S. The first keel is scheduled to be laid a year from now, with delivery of the ships expected between the fall of 1958 and spring of 1959.

Plates are moving somewhat more freely in the East but are still far below consumers' requirements. September shipments will probably prove disappointing to most buyers, for the reason that producers have considerable excess rated work which will have to be

worked off before the end of this month.

The stringency in supply will likely continue throughout the fall and winter months, as producers generally will have less than half of their second quarter pattern to supply against new orders in the fourth quarter.

The Johnstown, Pa., producer of universal plates will suspend operations Oct. 1 while heating furnaces are being rebuilt and other changes are being made. One eastern maker will be working on arrearages through at least November and will probably not open books for shipment beyond that month for another three or four weeks, pending an opportunity by that time to better gage its position.

In New England, demand for plates leans stronger to quality and specialty grades requiring longer processing, notably in the heavier sizes. Military and power plant equipment contributes more volume in this category. Weldment shops in the Northeast will be short of tonnage for fabricating over the next few weeks. Bookings for many grades are extended into December, with August orders not likely to be shipped before November.

A. M. Byers Co., Pittsburgh, reports that recent production improvements now make possible 30 to 45 day delivery of wrought iron plates. The improvements assure delivery by Nov. 1 of plate orders received before Sept. 15.

Wire . . .

Wire Prices, Pages 220 & 221

Wire manufacturers have little tonnage to apply against new orders before November. Exceptions include some merchant wire items.

Tubular Goods . . .

Tubular Goods Prices, Page 222

In the opinion of most salesmen, pipe mill order books will be overloaded with fourth Quarter tonnage for all tubular products. They report that the only slow ordering is in some merchant pipe sizes. Merchant pipe bookings are reported generally running about one month ahead.

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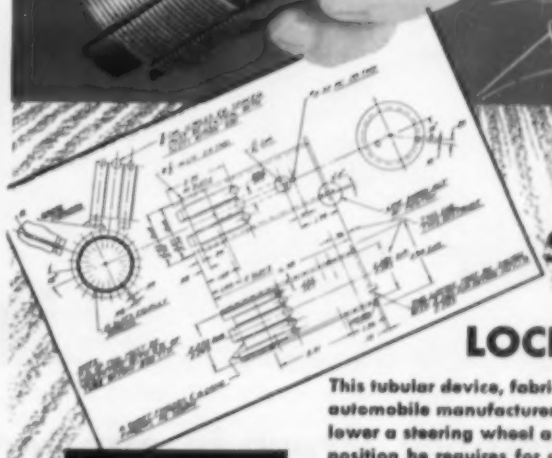

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SQUARE	Gauge	RECTANGULAR
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¾" to 1"	11 thru 22	½" minimum side to 5" maximum side
1" to 2"	11 thru 20	
2" to 3"	11 thru 18	

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One of the largest producers of pipe reports it had to refuse to accept orders for October delivery. In such items as oil country tubing, where demand far exceeded supply prior to the steel strike, producers have not taken much in the way of orders for October and November shipment.

Some pipe mills in the Pittsburgh district need repairs. As a result, production has not approached full capacity at several plants.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 218

Northwest Steel Rolling Mills Inc,. Seattle, is back in full operations following settlement of a strike which closed the plant Aug. 1. This mill has a substantial backlog, including 1350 tons of reinforcing for barracks and other construction at Ft. Lewis, Wash. Northwest announced increases in mill prices, in line with changes effected by other producers.

Considerable reinforcing tonnage is reported pending in the Pacific Northwest market. Much of it is for road projects in Washington and Oregon.

Pig Iron . . . .

Pig Iron Prices, Page 223

The foundries are consuming pig iron at a good rate, but they are still buying on a hand-to-mouth basis for the most part despite the prospects of tighter supplies this fall. Integrated steel producers are drawing more on their pig iron production for their own requirements.

Eastern gray iron shops are busy, and pig iron is moving to them from the furnaces in good volume with inventories rather limited. Most, if not all, foundries in the East have less than 30 days supply of iron, and some of them are literally on a hand-to-mouth basis. Consumers anticipate no further price advances at this time, and look for no particular tightness in supply over the next couple of months.

Mystic blast furnace, Everett, Mass., resumed blast after a major rebuilding. Rated capacity is unchanged, but emphasis is on improved controls with higher cooling plates in lining, replacement of steel shell above mantle, pig machine, stoves and ore bridge repairs.

Demand for iron in New England tends upward as Mystic shipments are resumed. No serious shortages were experienced, with better than 40,000 tons in stockpile at the stack, supplemented by sufficient tonnage from New York state furnaces.

Demand for merchant pig iron in western New York is not up to prestrike levels, but producers are looking for an upturn in foundry buying this month. Most of the foundries have been living off inventories built up in anticipation of a strike and a price advance.

There is less anxiety over supplies of iron than prevailed before the strike and foundries are buying their needs in a more conservative manner. But as stocks are worked off during the fourth quarter, the merchant iron trade looks for a decided pickup in business.

Western New York foundries are reported operating at fairly good levels in view of summer influences and the recent lull in the auto industry. Higher foundry production is expected in the fourth quarter, especially if the auto industry hits a fast production pace.

The big American Radiator plants in Buffalo, sizable consumers of iron, are back in production after settlement of an eight-week strike. This should result in a sharp increase in pig iron consumption.

Warehouse . . .

Warehouse Prices, Page 223

Most steel products are getting harder to get from the mills, and the fourth quarter will see some extreme shortages, according to distributors. Among the few products now in relatively free supply are sheets and strip.

Only small tonnages of plates and structurals have been shipped to warehouses, as the mills are concentrating in serving customers with emergency needs. Bars are the most recent product to tighten in supply at the warehouse level. Hot-rolled flats and rounds are increasingly scarce at warehouses, with demand rising. Heavy bars and reinforcing are in shortest supply.

A slight recovery from the 15 to 20 per cent decline in warehouse sales experienced in August is noted in New England. The increase is mostly in carbon sheets and alloy specialties. Lack of plates and structurals is retarding volume in the heavy products.

Iron Ore . . .

Iron Ore Prices, Page 224

Shipments of iron ore on the Great Lakes in the week ended Sept. 3 totaled 2,228,257 gross tons, reports the Lake Superior Iron Ore Association. This compares with 3,047,598 tons moved in the comparable week of 1955. Shipments for the season to Sept. 3 were 42,691,464 tons, far below the 55,798,098 shipped in the comparable portion of the 1955 navigation season. A drop of more than 5 million tons in August, due to the steel and shipping strikes, accounts for the major part of the decline. August shipments were only 8,045,028 tons against 13,572,266 in August a year ago.

Ferroalloys . . .

Ferroalloy Prices, Page 226

Climax Molybdenum Co. has reduced molybdenum alloy prices about 30 per cent and increased pure metallic molybdenum prices about 20 per cent. The changes reflect production experience, the company explains.

Under the new schedule, the base price of molybdenum alloy extruded ingots containing ½-per cent titanium is $10.60 a pound, f.o.b. Detroit. Pure metallic molybdenum extruded ingots are priced at $9.60 a pound, Detroit.

Buffalo Steel Rate Soars

Steel operations in the Buffalo area hit an all-time peak of 107.3 per cent of capacity last week with the lighting of another open hearth at the Wickwire Spencer Division of Colorado Fuel & Iron Corp.

A total of 45 of the district's 48 open hearths are in production. Bethlehem Steel is operating 34 out of 35, Republic Steel eight out of nine and Wickwire Spencer three out of four. This is about as high as the rate can get in view of continuing repairs to furnaces.

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Manufacturing Plants
2160 N.W. 25th Avenue
Portland 10, Oregon

1017 Griggs Street
Danville, Illinois

ESCO International and Eastern Sales:
420 Lexington Avenue, New York City, N.Y.

Other Offices and Warehouses:
Los Angeles, San Francisco, California; Seattle, Spokane, Washington; Salt Lake City, Utah; Denver, Colorado; Centralia, Pa.; Houston, Texas; Eugene, Oregon; Honolulu, Hawaii.

In Canada, ESCO Limited
Manufacturing Plants
Vancouver, British Columbia and Toronto, Ontario

Structural Shapes . . .

Structural Shape Prices, Page 218

Following a dip this summer, structural steel demand again is expanding. Some of the uncertainty as to deliveries and costs have been cleared away with the steel strike over and anticipated price increases effected. Extended deliveries are bridging the winter season.

Structural bookings in July totaled 288,166 tons for the first drop below the 300,000-ton mark since April, 1955, according to the American Institute of Steel Construction. The total was 33 per cent below the highest monthly figure last year, which occurred in July. Cumulative seven months bookings, however, were still 22 per cent ahead of those in the same period in 1955 — 2,465,014 tons, against 2,021,825 tons.

July shipments dropped to 165,470 tons, 25 per cent below those in July last year. Through July this year shipments were still 16 per cent ahead of last year's amounting to 1,889,666 tons, compared with 1,634,099 tons. As of July 31, structural backlogs climbed to about 45,000 tons above the June total to a level of 2,903,725 tons.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

13 000 tons, bridge, Connecticut river, Greater Hartford Bridge Authority, Wethersfield, Conn., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

1200 tons, cadet dining hall, Air Force Academy, Colorado Springs, Colo., to American Bridge Division, U. S. Steel Corp., Pittsburgh; bids direct, furnish, fabricate and erect.

870 tons, Einstein Medical Hospital, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.; also, 550 tons of reinforcing bars to the American Steel Engineering Co., Philadelphia.

660 tons, power transmission towers, Connecticut Light & Power Co., to Bethlehem Steel Co., Bethlehem, Pa.; 550 tons for rebuilding, Norwalk, Conn., and 110 tons, new towers, Meriden, Conn.

500 tons, addition, Crown Zellerbach paper plant, Linnwood, Oreg., to Pacific Car & Foundry Co., Seattle.

450 tons, Washington state Skykomish river bridge, to United Concrete Pipe Corp., Auburn, Wash.; Anderson Bridge Co., Tacoma, Wash., general contractor.

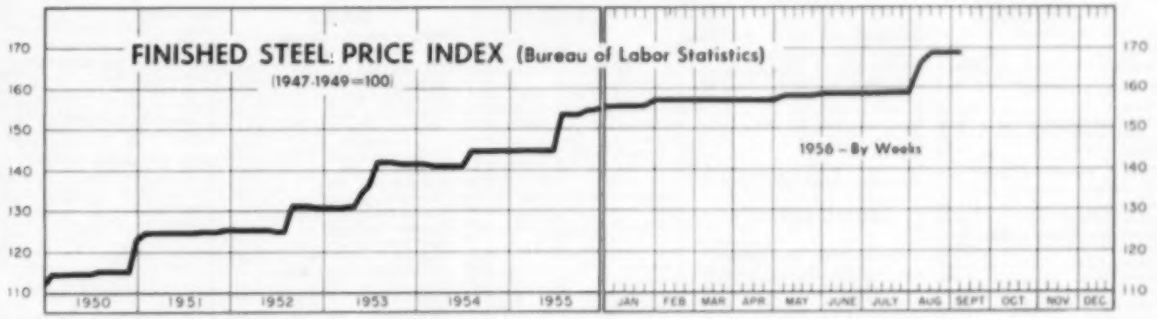
410 tons, Eagle Gorge relocation project, near Seattle, to United Concrete Pipe Corp., Auburn, Wash.; Slate-Hall-Hamilton, Portland, Oreg., general contractor, joint low to U. S. Engineer, Seattle, at $4,074,510.

315 tons, boiler supports, steam plant, Los Angeles, for Combustion Engineering Co., New York, to Bethlehem Steel Co., Bethlehem, Pa.

336 tons, Eagle Gorge railroad relocation, also 47 tons for E. 47th street span widening, Seattle, to United Concrete Pipe Co., Auburn, Wash.

(*Please turn to page* 227)

Price Indexes and Composites



Sept. 4, 1956	Week Ago	Month Ago	Aug. Avg.	Year ago
168.6	168.6	166.1	168.6	153.9

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Sept. 4

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.150	Bars, Reinforcing	5.738
Rails, Light, 40 lb	6.567	Bars, C.F., Carbon	9.610
Tie Plates	6.025	Bars, C.F., Alloy	13.275
Axles, Railway	8.950	Bars, C.F., Stainless, 302 (lb)	0.508
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.695
Plates, Carbon	5.550	Sheets, C.R., Carbon	6.639
Structural Shapes	5.267	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.635
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	11.225
Bars, Tool Steel, H. R. Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	8.843
Bars, Tool Steel, H.R., Alloy, High Speed W18 Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 403 (lb)	0.475
Bars, H.R., Alloy	10.025	Strip, H.R., Carbon	5.900
Bars, H.R., Stainless, 303 (lb)	0.483	Pipe, Black, Buttweld (100 ft)	18.376
Bars, H.R., Carbon	5.925	Pipe, Galv., Buttweld (100 ft)	22.516
		Pipe, Line (100 ft)	182.860
		Casing, Oil Well, Carbon (100 ft)	178.046
		Casing, Oil Well, Alloy (100 ft)	276.870
		Tubes, Boiler (100 ft)	45.033
		Tubing, Mechanical, Carbon (100 ft)	22.973
		Tubing, Mechanical, Stainless, 304 (100 ft)	187.133
		Tin Plate, Hot-dipped, 1.25 lb	9.333
		Tin Plate, Electrolytic, 0.25 lb	8.033
		Black Plate, Canmaking Quality	7.133
		Wire, Drawn, Carbon	9.175
		Wire, Drawn, Stainless, 430 (lb)	0.630
		Bale ties (bundle)	7.213
		Nails, Wire, 8d Common	9.368
		Wire, Barbed (80-rod spool)	8.412
		Woven Wire Fence (20-rod roll)	20.505

STEEL's FINISHED STEEL PRICE INDEX*

	Sept. 5 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	225.71	225.71	225.71	207.63	171.92
Index in cents per lb	6.114	6.114	6.114	5.625	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$137.75	$137.75	$137.75	$127.41	$106.32
No. 2 Fdry Pig Iron, GT	62.63	62.63	62.63	58.99	52.54
Basic Pig Iron, GT	62.18	62.18	62.18	58.49	52.16
Malleable Pig Iron, GT	63.41	63.41	63.41	59.77	53.27
Steelmaking Scrap, GT	58.83	58.83	54.83	44.00	44.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Sept. 5 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R., deld. Philadelphia	4.93	4.93	4.93	4.90	4.223
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	5.90	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld. Philadelphia	5.00	5.00	5.00	4.88	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	4.80	4.50	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.35	5.35	5.35	4.50	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.325-5.425	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25-6.45	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.35-6.45	4.90
Strip, C.R., Detroit	6.95	6.95	6.35	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.25	4.85-5.10
Nails, Wire, Pittsburgh	8.35	8.35	8.35	7.60	5.90-6.20
Tin plate (1.50 lb.) box, Pitts.	$9.85	$9.85	$9.85	$9.95	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL					
Billets forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	5.80	5.80	5.80	5.025	4.10-4.20

PIG IRON, Gross Ton	Sept. 5 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$63.50	$63.50	$63.50	$59.50	$53.00
Basic, Valley	62.50	62.50	62.50	58.50	52.00
Basic, deld. Phila.	66.26	66.26	66.26	59.16	56.61
No. 2 Fdry, NevilleIsland, Pa.	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, Chicago	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, deld. Phila.	66.76	66.76	66.76	59.66	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	63.00	63.00	63.00	59.00	52.50
Malleable, Chicago	63.00	63.00	63.00	59.00	52.50
Ferromanganese, Duquesne	215.00†	215.00†	215.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$58.50	$58.50	$55.50	$43.50	$45.00
No. 1 Heavy Melt, E. Pa.	59.00	59.00	55.00	46.50	43.50
No. 1 Heavy Melt, Chicago	59.00	59.00	54.00	42.00	43.50
No. 1 Heavy Melt, Valley	65.50	64.50	60.50	46.50	45.00
No. 1 Heavy Melt, Cleve.	63.00	62.00	57.50	44.00	44.00
No. 1 Heavy Melt, Buffalo	56.50	56.50	49.50	39.50	44.00
Rails, Rerolling, Chicago	84.50	84.50	75.50	64.50	52.50
No. 1 Cast Chicago	53.50	53.50	50.50	46.50	49.00

COKE, Net Ton					
Beehive, Furn, Connisvl.	$14.50	$14.50	$14.125	$13.625	$14.75
Beehive, Fdry, Connisvl.	17.50	17.50	16.50	16.50	17.50

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 219; to footnotes, page 221.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ..... $70.50

INGOTS, Alloy (NT)

Detroit R7 ..... $69.00
Houston S5 ..... 74.00
Midland,Pa. C18 ..... 74.00
Munhall,Pa. U5 ..... 74.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ..... $74.00
Bessemer,Pa. U5 ..... 74.00
Bridgeport,Conn. N19 .. 79.00
Buffalo R2 ..... 74.00
Clairton,Pa. U5 ..... 74.00
Ensley,Ala. T2 ..... 74.00
Fairfield,Ala. T2 ..... 74.00
Fontana,Calif. K1 ..... 83.50
Gary,Ind. U5 ..... 74.00
Johnstown,Pa. B2 ..... 74.00
Lackawanna,N.Y. B2 .. 74.00
LoneStar,Tex. L6 ..... 74.50
Munhall,Pa. U5 ..... 74.00
Pittsburgh J5 ..... 74.00
S.Chicago,Ill. R2, U5 .. 74.00
S.Duquesne,Pa. U5 ..... 74.00
Sterling,Ill. N15 ..... 74.00
Youngstown R2 ..... 74.00

Carbon, Forging (NT)

Aliquippa,Pa. J5 ..... $91.50
Bessemer,Pa. U5 ..... 91.50
Bridgeport,Conn. N19 .. 96.50
Buffalo R2 ..... 91.50
Canton,O. R2 ..... 94.00
Clairton,Pa. U5 ..... 91.50
Conshohocken,Pa. A3 .. 96.50
Ensley,Ala. T2 ..... 91.50
Fairfield,Ala. T2 ..... 91.50
Fontana,Calif. K1 ..... 101.00
Gary,Ind. U5 ..... 91.50
Geneva,Utah C11 ..... 91.50
Houston S5 ..... 96.50
Johnstown,Pa. B2 ..... 91.50
Lackawanna,N.Y. B2 .. 91.50
LosAngeles B3 ..... 101.00
Midland,Pa. C18 ..... 91.50
Munhall,Pa. U5 ..... 91.50
Pittsburgh J5 ..... 91.50
Seattle B3 ..... 105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 ..... 91.50
S.SanFrancisco B3 ..... 101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 .. $107.00
Bridgeport,Conn. N19 .. 107.00
Buffalo R2 ..... 107.00
Canton,O. R2 ..... 107.00
Conshohocken,Pa. A3 .. 114.00
Detroit R7 ..... 96.00
Fontana,Calif. K1 ..... 128.00
Gary,Ind. U5 ..... 107.00
Houston S5 ..... 112.00
Ind.Harbor,Ind. Y1 .. 107.00
Johnstown,Pa. B2 ..... 107.00
Lackawanna,N.Y. B2 .. 107.00
LosAngeles B3 ..... 127.00
Massillon,O. R2 ..... 107.00
Midland,Pa. C18 ..... 107.00
Munhall,Pa. U5 ..... 107.00
S.Chicago R2,U5,W14 .. 107.00
S.Duquesne,Pa. U5 .. 107.00
Struthers,O. Y1 ..... 107.00
Warren,O. C17 ..... 107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19 $116.50
Buffalo R2 ..... 111.50
Canton,O. R2 ..... 114.00
Cleveland R2 ..... 111.50
Gary,Ind. U5 ..... 111.50
S.Chicago,Ill. R2, W14 111.50
S. Duquesne,Pa. U5 .. 111.50

SKELP

Aliquippa,Pa. J5 ..... 4.725
LoneStar,Tex. L6 ..... 4.825
Munhall,Pa. U5 ..... 4.625
SparrowsPoint,Md. B2 .. 4.625
Warren,O. R2 ..... 4.625
Youngstown R2, U5 .. 4.625

WIRE RODS

AlabamaCity,Ala. R2 .. 5.80
Aliquippa,Pa. J5 ..... 5.80
Alton,Ill. L1 ..... 6.00
Buffalo W12 ..... 5.80
Cleveland A7 ..... 5.80
Donora,Pa. A7 ..... 5.80
Fairfield,Ala. T2 ..... 5.80
Houston S5 ..... 6.05
IndianaHarbor,Ind. Y1 .. 5.80
Johnstown,Pa. B2 ..... 5.80
Joliet,Ill. A7 ..... 5.80
KansasCity,Mo. S5 ..... 6.05
Kokomo,Ind. C16 ..... 5.90
LosAngeles B2 ..... 6.60
Minnequa,Colo. C10 ..... 6.05
Monessen,Pa. P7 ..... 5.80
N.Tonawanda,N.Y. B11 .. 5.80
Pittsburg,Calif. C11 ..... 6.45
Portsmouth,O. P12 ..... 5.80
Roebling,N.J. R5 ..... 5.90
S.Chicago,Ill. R2 ..... 5.80
SparrowsPoint,Md. B2 .. 5.90
Sterling,Ill.(1) N15 ..... 5.80
Sterling,Ill. N15 ..... 5.90
Struthers,O. Y1 ..... 5.80
Worcester,Mass. A7 ..... 6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 ..... 5.00
Aliquippa,Pa. J5 ..... 5.00
Bessemer,Ala. T2 ..... 5.00
Bethlehem,Pa. B2 ..... 5.05
Birmingham C15 ..... 5.30
Clairton,Pa. U5 ..... 5.00
Fairfield,Ala. T2 ..... 5.00
Fontana,Calif. K1 ..... 5.70
Gary,Ind. U5 ..... 5.00
Geneva,Utah C11 ..... 5.00
Houston S5 ..... 5.10
Ind.Harbor,Ind. I-2 ..... 5.00
Johnstown,Pa. B2 ..... 5.05
KansasCity,Mo. S6 ..... 5.10
Lackawanna,N.Y. B2 .. 5.05
LosAngeles B3 ..... 5.70
Minnequa,Colo. C10 ..... 5.30
Munhall,Pa. U5 ..... 5.00
Niles,Calif. P1 ..... 5.75
Phoenixville,Pa. P4 ..... 5.85
Portland,Oreg. O4 ..... 5.80
Seattle B3 ..... 5.75
S.Chicago,Ill. U5, W14 .. 5.00
S.SanFrancisco B3 ..... 5.65
Sterling,Ill. N15 ..... 5.00
Torrance,Calif. C11 ..... 5.70
Weirton,W.Va. W6 ..... 5.00

Wide Flange

Bethlehem,Pa. B2 ..... 5.05
Clairton,Pa. U5 ..... 5.00
Fontana,Calif. K1 ..... 5.85
IndianaHarbor,Ind. I-2 .. 5.00
Lackawanna,N.Y. B2 .. 5.05
Munhall,Pa. U5 ..... 5.00
Phoenixville,Pa. P4 ..... 5.85
S.Chicago,Ill. U5 ..... 5.00

Alloy Std. Shapes

Clairton,Pa. U5 ..... 6.20
Fontana,Calif. K1 ..... 7.85
Gary,Ind. U5 ..... 6.20
Houston S5 ..... 6.30
Munhall,Pa. U5 ..... 6.20
S.Chicago,Ill. U5 ..... 6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 ..... 7.35
Bessemer,Ala. T2 ..... 7.35
Bethlehem,Pa. B2 ..... 7.40
Clairton,Pa. U5 ..... 7.35
Fairfield,Ala. T2 ..... 7.35
Fontana,Calif. K1 ..... 8.05
Gary,Ind. U5 ..... 7.35
Geneva,Utah C11 ..... 7.35
Houston S5 ..... 7.45
Ind.Harbor,Ind. I-2, Y1 7.35
Johnstown,Pa. B2 ..... 7.40
KansasCity,Mo. S5 ..... 7.45
Lackawanna,N.Y. B2 .. 7.40
LosAngeles B3 ..... 8.05
Munhall,Pa. U5 ..... 7.35
Seattle B3 ..... 8.10
S.Chicago,Ill. U5, W14 .. 7.35
S.SanFrancisco B3 ..... 8.00
Struthers,O. Y1 ..... 7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ..... 7.40
Ind.Harbor,Ind. I-2 ..... 7.35
Lackawanna,N.Y. B2 .. 7.40
Munhall,Pa. U5 ..... 7.35
S.Chicago,Ill. U5 ..... 7.35

PILING

BEARING PILES

Bethlehem,Pa. B2 ..... 4.65
Lackawanna,N.Y. B2 .. 4.65
Munhall,Pa. U5 ..... 5.00
S.Chicago,Ill. U5 ..... 5.00

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ..... 5.90
Lackawanna,N.Y. B2 ..... 5.90
Munhall,Pa. U5 ..... 5.90
S.Chicago,Ill. U5 ..... 5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 ..... 4.85
Aliquippa,Pa. J5 ..... 4.85
Ashland,Ky. (15) A10 .. 4.85
Bessemer,Ala. T2 ..... 4.85
Bridgeport,Conn. N19 .. 4.75
Clairton,Pa. U5 ..... 4.85
Claymont, Del. C22 ..... 5.35
Cleveland J5, R2 ..... 4.95
Coatesville,Pa. L7 ..... 5.25
Conshohocken,Pa. A3 .. 4.90
Detroit M1 ..... 4.60
Ecorse,Mich. G5 ..... 4.95
Fairfield,Ala. T2 ..... 4.85
Fontana,Calif.(30) K1 .. 5.55
Gary,Ind. U5 ..... 4.85
Geneva,Utah C11 ..... 4.85
GraniteCity,Ill. G4 ..... 5.05
Harrisburg,Pa. P4 ..... 5.80
Houston S5 ..... 4.95
Ind.Harbor,Ind. I-2, Y1 4.85
Johnstown,Pa. B2 ..... 4.85
Lackawanna,N.Y. B2 .. 4.85
LoneStar,Tex. L6 ..... 4.85
Minnequa,Colo. C10 ..... 5.70
Munhall,Pa. U5 ..... 4.85
Newport,Ky. N9 ..... 4.85
Pittsburgh J5 ..... 4.85
Riverdale,Ill. A1 ..... 4.85
Seattle B3 ..... 5.75
Sharon,Pa. S3 ..... 4.85
S.Chicago,Ill. U5, W14 .. 4.85
SparrowsPoint,Md. B2 .. 4.85
Steubenville,O. W10 ..... 4.85
Warren,O. R2 ..... 4.85
Weirton,W.Va. W6 ..... 4.85
Youngstown R2, U5, Y1 4.85

PLATES, Carbon Abras. Resist.

Claymont, Del. C22 ..... 6.20
Fontana,Calif. K1 ..... 6.70
Geneva,Utah C11 ..... 6.00
Johnstown,Pa. B2 ..... 5.65
SparrowsPoint,Md. B2 .. 5.65

PLATES, Wrought Iron

Economy,Pa. B14 ..... 11.125

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 7.25
Bessemer,Ala. T2 ..... 7.25
Clairton,Pa. U5 ..... 7.25
Claymont, Del. C22 ..... 7.55
Cleveland J5, R2 ..... 7.25
Coatesville,Pa. L7 ..... 7.55
Conshohocken,Pa. A3 .. 7.25
Ecorse,Mich. G5 ..... 7.35
Fairfield,Ala. T2 ..... 7.25
Fontana,Calif.(30) K1 .. 7.95
Gary,Ind. U5 ..... 7.25
Geneva,Utah C11 ..... 7.25
Houston S5 ..... 7.35
Ind.Harbor,Ind. I-2, Y1 7.25
Johnstown,Pa. B2 ..... 7.25
Munhall,Pa. U5 ..... 7.25
Pittsburgh J5 ..... 7.25
Seattle B3 ..... 8.15
Sharon,Pa. S3 ..... 7.25
S.Chicago,Ill. U5, W14 .. 7.25
SparrowsPoint,Md. B2 .. 7.25
Warren,O. R2 ..... 7.25
Youngstown U5, Y1 ..... 7.25

PLATES, Alloy

Bridgeport,Conn. N19 .. 6.85
Claymont, Del. C22 ..... 6.85
Coatesville,Pa. L7 ..... 6.85
Fontana,Calif.(30) K1 .. 7.55
Gary,Ind. U5 ..... 6.85
Houston S5 ..... 6.95
Ind.Harbor,Ind. Y1 ..... 6.85
Johnstown,Pa. B2 ..... 6.85
Munhall,Pa. U5 ..... 6.85
Newport,Ky. N9 ..... 6.85
Seattle B3 ..... 7.75
Sharon,Pa. S3 ..... 6.85
S.Chicago,Ill. U5, W14 .. 6.85
SparrowsPoint,Md. B2 .. 6.85
Youngstown Y1 ..... 6.85

FLOOR PLATES

Cleveland J5 ..... 5.925
Conshohocken,Pa. A3 .. 5.925
Harrisburg,Pa. P4 ..... 6.275
Ind.Harbor,Ind. I-2 .... 5.925
Munhall,Pa. U5 ..... 5.925
S.Chicago,Ill. U5 ..... 5.925

PLATES, Ingot Iron

Ashland e.l. (15) A10 5.10
Ashland l.c.l. (15) A10 .. 5.60
Cleveland c.l. R2 ..... 5.60
Warren,O. c.l. R2 ..... 5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 .. 5.075
Aliquippa,Pa(9) J5 ... 5.075
Alton,Ill. L1 ..... 5.275
Atlanta(9) A11 ..... 5.575
Bessemer,Ala.(9) T2 .. 5.075
Birmingham(9) C15 ... 5.375
Bridgeport,Conn. N19 .. 5.30
Buffalo(9) R2 ..... 5.075
Clairton,Pa. U5 ..... 5.075
Cleveland(9) R2 ..... 5.075
Ecorse,Mich.(9) G5 ... 5.175
Emeryville,Calif. J7 .... 5.85
Fairfield,Ala.(9) T2 .. 5.075
Fairless,Pa.(9) U5 .... 5.225
Fontana,Calif.(9) K1 .. 5.775
Gary,Ind.(9) U5 ..... 5.075
Geneva(9) C11 ..... 5.175
Houston(9) S5 ..... 5.325
Ind.Harbor(9) I-2, Y1 .. 5.075
Johnstown,Pa.(9) B2 .. 5.075
Joliet,Ill. P22 ..... 5.575
KansasCity,Mo.(9) S3 .. 5.325
Lackawanna(9) B2 ..... 5.075
LosAngeles(9) B3 ..... 5.775
Midland,Pa.(9) C18 ..... 5.425
Milton,Pa.(23) M18 ..... 5.425
Minnequa,Colo. C10 .. 5.525
Niles,Calif. P1 ..... 5.85
N.T'wanda,N.Y.(9)B11 .. 5.075
Pittsburg,Calif.(9) C11 .. 5.775
Pittsburgh(9) J5 ..... 5.075
Portland,Oreg. O4 ..... 5.85
Seattle B3, N14 ..... 5.825
S.Ch'c'go(9) R2,U5,W14 .. 5.075
S.Duquesne,Pa.(9) U5 .. 5.075
S.SanFran.,Calif.(9) B3 .. 5.825
Sterling,Ill.(1) N15 .. 5.075
Sterling,Ill. N15 ..... 5.175
Struthers,O. Y1 ..... 5.075
Torrance,Calif.(9) C11 .. 5.775
Weirton,W.Va.(9) W6 .. 5.075
Youngstown(9) R2, U5 .. 5.075

BARS, H.R. Leaded Alloy

Warren,O. C17 ..... 7.125

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ..... 6.125
Bridgeport,Conn. N19 .. 6.20
Buffalo R2 ..... 6.125
Canton,O. R2 ..... 6.125
Clairton,Pa. U5 ..... 6.125
Detroit R7 ..... 5.575
Ecorse,Mich. G5 ..... 6.225
Fairless,Pa. U5 ..... 6.275
Fontana,Calif. K1 ..... 7.175
Gary,Ind. U5 ..... 6.125
Houston S5 ..... 6.375
Ind.Harbor,Ind. I-2, Y1 6.125
Johnstown,Pa. B2 ..... 6.125
KansasCity,Mo. S5 .. 6.375
Lackawanna,N.Y. B2 .. 6.125
LosAngeles B3 ..... 7.175
Massillon,O. R2 ..... 6.125
Midland,Pa. C18 ..... 6.125
S.Chicago R2, U5, W14 6.125
S.Duquesne,Pa. U5 .... 6.125
Struthers,O. Y1 ..... 6.125
Warren,O. C17 ..... 6.125
Youngstown U5 ..... 6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 7.425
Bessemer,Ala. T2 ..... 7.425
Bethlehem,Pa. B2 ..... 7.425
Bridgeport,Conn. N19 .. 7.50
Clairton,Pa. U5 ..... 7.425
Cleveland R2 ..... 7.425
Ecorse,Mich. G5 ..... 7.525
Fairfield,Ala. T2 ..... 7.425
Fontana,Calif. K1 ..... 8.125
Gary,Ind. U5 ..... 7.425
Houston S5 ..... 7.675
Ind.Harbor,Ind. Y1 .. 7.425
Johnstown,Pa. B2 ..... 7.425
KansasCity,Mo. S5 .... 7.675
Lackawanna,N.Y. B2 .. 7.425
LosAngeles B3 ..... 8.125
Pittsburgh J5 ..... 7.425
Seattle B3 ..... 8.175
S.Chicago U5, W14 .. 7.425
S.Duquesne,Pa. U5 .... 7.425
S.SanFrancisco B3 .... 8.175
Struthers,O. Y1 ..... 7.425
Youngstown U5 ..... 7.425

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 .. 5.225
Lackawanna(9) B2 .... 5.075
Sterling,Ill. N15 ..... 5.175
Sterling,Ill.(1) N15 ..... 5.075

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ..... 5.075
Atlanta A11 ..... 5.575
Fontana,Calif. K1 ..... 5.35
Joliet,Ill. P22 ..... 5.10
Niles,Calif. P1 ..... 5.95
Pittsburgh J5 ..... 5.075
Portland,Oreg. O4 ..... 5.85
SanFrancisco S7 ..... 5.95

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 ..... 6.20
Gary,Ind. U5 ..... 6.20
Houston S5 ..... 6.45
KansasCity,Mo. S5 .... 6.45
Youngstown U5 ..... 6.20

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18 ... 9.225
Chicago W18 ..... 9.225
Cleveland C20 ..... 8.325
Monaca,Pa. S17 ..... 9.225
Newark,N.J. W18 ..... 9.40
SpringCity,Pa. K3 ..... 8.30
Warren,O. C17 ..... 9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .... 6.85
BeaverFalls,Pa. M12,R2 .. 6.85
Bridgeport,Conn. N19 .. 7.20
Buffalo B5 ..... 6.90
Camden,N.J. P13 ..... 7.30
Carnegie,Pa. C12 ..... 6.85
Chicago W18 ..... 6.85
Cleveland A7, C20 ..... 6.85
Detroit B5, P17 ..... 7.05
Detroit R7 ..... 6.25
Donora,Pa. A7 ..... 6.85
Elyria,O. W8 ..... 6.85
FranklinPrk,Ill. N5 .... 6.85
Gary,Ind. U5 ..... 6.85
GreenBay,Wis. F7 .... 6.85
Hammond,Ind. L2, M13 .. 6.85
Hartford,Conn. R2 .... 7.35
Harvey,Ill. B5 ..... 6.85
LosAngeles(49) S30 .... 7.70
LosAngeles R2 ..... 8.30
Mansfield,Mass. B5 .... 7.40
Massillon,O. R2, R8 .. 6.85
Midland,Pa. C18 ..... 6.85
Monaca,Pa. S17 ..... 6.85
Newark,N.J. W18 ..... 7.30
NewCastle,Pa.(17) B4 .. 6.85
Pittsburgh J5 ..... 6.85
Plymouth,Mich. P5 .... 7.10
Putnam,Conn. W18 .... 7.40
Readville,Mass. C14 .... 7.40
S.Chicago,Ill. W14 .... 6.85
SpringCity,Pa. K3 .... 7.30
Struthers,O. Y1 ..... 6.85
Waukegan,Ill. A7 ..... 6.85
Youngstown F3, Y1 .... 6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19 .. 6.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 .... 8.325
BeaverFalls,Pa. M12,R2 .. 8.325
Bethlehem,Pa. B2 ..... 8.325
Bridgeport,Conn. N19 .. 8.475
Buffalo B5 ..... 8.325
Camden,N.J. P13 ..... 8.50
Canton,O. T7 ..... 7.425
Carnegie,Pa. C12 ..... 8.325
Chicago W18 ..... 8.325
Cleveland A7, C20 .... 8.325
Detroit B5, P17 ..... 8.525
Detroit R7 ..... 7.425
Donora,Pa. A7 ..... 8.325
Elyria,O. W8 ..... 8.325
FranklinPark,Ill. N5 .. 8.325
Gary,Ind. R2 ..... 8.325
GreenBay,Wis. F7 .... 8.325
Hammond,Ind. L2,M13 .. 8.325
Hartford,Conn. R2 .. 8.625
Harvey,Ill. B5 ..... 8.325
Lackawanna,N.Y. B2 .. 8.325
LosAngeles S30 ..... 9.10
Mansfield,Mass. B5 ... 8.625
Massillon,O. R2, R8 .. 8.325
Midland,Pa. C18 ..... 8.325
Monaca,Pa. S17 ..... 8.325
Newark,N.J. W18 .... 8.50
Plymouth,Mich. P5 .... 8.525
S.Chicago W14 ..... 8.325
SpringCity,Pa. K3 .... 8.50
Struthers,O. Y1 ..... 8.325
Warren,O. C17 ..... 8.325
Waukegan,Ill. A7 ..... 8.325
Worcester,Mass. A7 .. 8.625
Youngstown F3, Y1 .. 8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 ..... 5.075
Atlanta A11 ..... 5.575
Birmingham C15 ..... 5.375
Bridgeport,Conn. N19 .. 5.30
Buffalo R2 ..... 5.075
Cleveland R2 ..... 5.075
Ecorse,Mich. G5 ..... 5.425
Emeryville,Calif. J7 .... 5.85
Fairfield,Ala. T2 ..... 5.075
Fairless,Pa. U5 ..... 5.225
Fontana,Calif. K1 ..... 5.80

Ft. Worth, Tex. (42) T4 .5.525
Gary, Ind. U5 .....5.075
Houston B5 .....5.325
Ind. Harbor, Ind. I-2, Y1 5.075
Johnstown, Pa. B2 .....5.075
Joliet, Ill. P22 .....5.575
KansasCity, Mo. B5 ..5.325
Lackawanna, N.Y. B2 ..5.075
LosAngeles B3 .....5.775
Milton, Pa. M18 .....5.225
Minnequa, Colo. C10 ..5.525
Niles, Calif. P1 .....5.85
Pittsburg, Calif. C11 ..5.775
Pittsburgh J5 .....5.075
Portland, Oreg. 04 .....5.85
SandSprings, Okla. S5 ..5.575
Seattle B3 N14 .....5.825
S. Chicago R2 .....5.075
S. Duquesne, Pa. U5 ....5.075
S. SanFrancisco B3 ....5.825
SparrowsPoint, Md. B2 5.075
Sterling, Ill. (1) N15 ..5.075
Sterling, Ill. N15 .....5.175
Struthers, O. Y1 .....5.075
Torrance, Calif. C11 ....5.775
Youngstown R2, U5 ....5.075

BARS, Reinforcing
(Fabricated; to Consumers)

Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown, Pa. ½-1" B2 6.73
KansasCity, Kans. S5 ..6.825
Lackawanna, N.Y. B2 ..6.17
Marion, O. P11 .....6.15
New York U8 .....7.18
Pittsburgh U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ½-1" B2 ..6.73
Williamsport, Pa. S19 ..6.65

RAIL STEEL BARS

ChicagoHts. (3) C2, I-2 5.075
ChicagoHts. (4) I-2 ....5.075
ChicagoHts. (4) C2 .....5.65
Ft. Worth, Tex. (26) T4 ..5.525
Franklin, Pa. (4) F5 .....5.60
Franklin, Pa. (3) F5 .....5.10
JerseyShore, Pa. (4) J8 ..5.00
Marion, O. (3) P11 .....4.65
Moline, Ill. (3) R2 .....5.225
Tonawanda (3) B12 .....5.65
Tonawanda (4) B12 .....6.15
Williamsport, Pa. (3) S19 5.65

BARS, Wrought Iron

Economy, Pa. (S.R.) B14 12.305
Economy, Pa. (D.R.) B14 15.301
Economy (Staybolt) B14 15.676
McK.Rks. (S.R.) L5 ..12.305
McK.Rks. (D.R.) L5 ...16.00
McK.Rks. (Staybolt) L5 17.00

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala. City, Ala. R2 .....4.675
Allenport, Pa. P7 .....4.675
Ashland, Ky. (8) A10 ..4.675
Cleveland J5, R2 ....4.675
Conshohocken, Pa. A3 .4.725
Detroit (8) M1 .....4.775
Dravosburg, Pa. U5 ....4.675
Ecorse, Mich. G5 .....4.775
Fairfield, Ala. T2 .....4.675
Fairless, Pa. U5 .....4.725
Fontana, Calif. K1 ....5.475
Gary, Ind. U5 .....4.675
Geneva, Utah C11 .....4.775
GraniteCity, Ill. (8) G4 ..4.875
IndHarbor, Ind. I-2, Y1 4.675
Lackawanna, N.Y. B2 ..4.675
Munhall, Pa. U5 .....4.675
Newport, Ky. (8) N9 ..4.675
Niles, O. M21 .....4.675
Pittsburg, Calif. C11 ..5.375
Pittsburgh J5 .....4.675
Portsmouth, O. P12 ....4.675
Riverdale, Ill. A1 .....4.675
Sharon, Pa. S3 .....4.675
S. Chicago, Ill. W14 ....4.675
SparrowsPoint, Md. B2 .4.675
Steubenville, O. W10 ..4.675
Warren, O. R2 .....4.675
Weirton, W.Va. W6 ....4.675
Youngstown U5, Y1 ..4.675

SHEETS, H.R., (19 ga. & Lighter)

Niles, O. M21 .....5.75

SHEETS, H.R. Alloy

Dravosburg, Pa. U5 ....7.75
Gary, Ind. U5 .....7.75
Ind. Harbor, Ind. Y1 ....7.75
Newport, Ky. N9 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier)
High-Strength Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken, Pa. A3 ..6.95
Dravosburg, Pa. U5 .....6.90
Ecorse, Mich. G5 .....7.00
Fairfield, Ala. T2 .....6.90
Fairless, Pa. U5 .....6.95
Fontana, Calif. K1 ....7.70
Gary, Ind. U5 .....6.90
Ind. Harbor, Ind. I-2, Y1 6.90
Lackawanna (35) B2 ....6.90
Munhall, Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S. Chicago, Ill. U5 .....6.90
SparrowsPoint (36) B2 6.90
Warren, O. R2 .....6.90
Weirton, W.Va. W6 ....6.90
Youngstown U5, Y1 ..6.90

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland, Ky. (8) A10 .. 4.925
Cleveland R2 .....5.425
Ind. Harbor, Ind. I-2 .... 4.925
Warren, O. R2 .....5.425

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport, Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken, Pa. A3 ...5.80
Dravosburg, Pa. U5 ....5.75
Detroit M1 .....5.75
Ecorse, Mich. G5 .....5.85
Fairfield, Ala. T2 .....5.75
Fairless, Pa. U5 .....5.80
Follansbee, W.Va. F4 ..5.75
Fontana, Calif. K1 .....6.95
Gary, Ind. U5 .....5.75
GraniteCity, Ill. G4 ....5.95
Ind. Harbor, Ind. I-2, Y1 5.75
Lackawanna, N.Y. B2 ..5.75
Mansfield, O. E6 .....5.75
Middletown, O. A10 ....5.75
Newport, Ky. N9 .....5.75
Pittsburg, Calif. C11 ..6.70
Pittsburgh J5 .....5.75
Portsmouth, O. P12 .....5.75
SparrowsPoint, Md. B2 5.75
Steubenville, O. W10 ....5.75
Warren, O. R2 .....5.75
Weirton, W.Va. W6 ....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled
High-Strength, Low-Alloy

Cleveland J5, R2 .....8.525
Dravosburg, Pa. U5 ..8.525
Ecorse, Mich. G5 .....8.625
Fairless, Pa. U5 .....8.575
Fontana, Calif. K1 ....9.725
Gary, Ind. U5 .....8.525
IndianaHarbor, Ind. Y1 8.525
Lackawanna (37) B2 ..8.525
Pittsburgh J5 .....8.525
SparrowsPoint (38) B2 8.525
Warren, O. R2 .....8.525
Weirton, W.Va. W6 ....8.525
Youngstown Y1.....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown, O. A10 ....6.25
Warren, O. R2 .....6.50

SHEETS, Culvert	Cu Steel	Cu Fe
Ashland, Ky.	A10 6.65	6.90
Canton, O.	R2 6.65	7.15
Dravosburg	U5 6.65	6.90
Fairfield	T2 6.65	6.90
Gary, Ind.	U5 6.65	6.90
Ind. Harbor	I-2 6.65	6.90
Kokomo, Ind.	C16 6.75	...
MartinsFry.	W10 6.65	...
Pitts., Calif.	C11 7.40	...
SparrowsPt.	B2 6.65	...

SHEETS, Culvert—Pure Iron

Dravosburg U5 .....6.90
Gary, Ind. U5 .....6.90
Ind. Harbor, Ind. I-2 ....6.90
MartinsFry. O. W10 ....6.90

SHEETS, Galvanized Steel
Hot-Dipped

Ala. City, Ala. R2 .....6.30†
Ashland, Ky. A10 .....6.30†
Canton, O. R2 .....6.30†
Dover, O. R1 .....6.30†
Dravosburg, Pa. U5 ....6.30†
Fairfield, Ala. T2 .....6.30†
Gary, Ind. U5 .....6.30†
GraniteCity, Ill. G4 ....6.50†
Ind. Harbor, Ind. I-2 ..6.30†
Kokomo, Ind. C16 .....6.40†
MartinsFerry, O. W10 ..6.30*
Middletown, O. A10 ....6.30†
Pittsburg, Calif. C11 ....7.05*
Pittsburgh J5 .....6.30†
SparrowsPt., Md. B2 ..6.30†
Warren, O. R2 .....6.30†
Weirton, W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana, Calif. K1 ....6.975

SHEETS, Galvanized
High-Strength Low-Alloy

Dravosburg, Pa. U5 ..9.275
SparrowsPoint (39) B2 9.275

SHEETS, Galvannealed Steel

Canton, O. R2 .....6.70
Dravosburg, Pa. U5 ....6.70
Kokomo, Ind. C16 .....7.00

SHEETS, Galvanized Ingot Iron
(Hot-dipped Continuous)

Ashland, Ky. A10 .....6.55
Middletown, O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland (28) R2 .....7.125
Niles, O. (28) R2 .....7.125
Weirton, W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler, Pa. A10 (type 1)8.95
Butler, Pa. A10 (type 2)9.05

SHEETS, Enameling Iron

Ashland, Ky. A10 .....6.325
Cleveland R2 .....6.325
Dravosburg, Pa. U5 ....6.325
Gary, Ind. U5 .....6.325
GraniteCity, Ill. G4 ....6.525
Ind. Harbor, Ind. I-2, Y1 6.325
Middletown, O. A10 ....6.325
Niles, O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee, W.Va. F4 ..8.175
Ind. Harbor, Ind. I-2 ..8.175
Yorkville, O. W10 .....8.175

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom, W.Va. W10 6.70
Gary, Ind. U5 .....6.70
Mansfield, O. E6 .....6.70
Middletown, O. A10 ....6.70
Niles, O. M21 .....6.70
Weirton, W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown, O. A10 ...7.10

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A19 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept., Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div. Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National-Standard Co.
N2 National Supply Co.
N3 NationalTube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New Eng. High Carb. Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest. SteelRoll Mill
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 PacificStatesSteelCorp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div., EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div. H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.675
Allenport,Pa. P7 .....4.675
Alton,Ill. L1 .....4.675
Ashland,Ky.(8) A19 ..4.675
Atlanta A11 .....4.675
Bessemer,Ala. T2 .....4.675
Birmingham C15 .....4.975
Bridgeport,Conn. N19 ..4.625
Buffalo(27) R2 .....4.675
Conshohocken,Pa. A3 ..4.725
Detroit M1 .....4.775
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 .....4.675
Fontana,Calif. K1 ....5.475
Gary,Ind. U5 .....4.675
Houston S5 .....4.925
Ind.Harbor,Ind. I-2, Y1 4.675
Johnstown,Pa.(25) B2 4.675
KansasCity S5 .....4.925
Lackawanna,N.Y.(25) B2 4.675
LosAngeles(25) B3 ....5.425
Minnequa,Colo. C10 ...5.775
Pittsburg,Calif. C11 ..5.425
Riverdale,Ill. A1 .....4.675
SanFrancisco S7 .....5.95
Seattle(25) B3 .....5.675
Seattle N14 .....5.675
Sharon,Pa. S3 .....4.675
S.Chicago Ill. W14 ...4.675
S.SanFrancisco(25) B3 5.425
SparrowsPoint,Md. B2..4.675
Sterling,Ill.(1) N15 ..4.675
Sterling,Ill. N15 .....4.775
Torrance,Calif. C11 ..5.425
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5 .....4.675

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19 ..7.80
Carnegie,Pa. S18 .....7.75
Dravosburg U5 .....7.75
Fontana,Calif. K1 ....9.65
Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
LosAngeles B3 .....8.95
Newport,Ky. N9 .....7.75
Sharon,Pa. S3 .....7.75
S.Chicago W14 .....7.75
Youngstown U5, Y1 ...7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2 .....6.95
Conshohocken,Pa. A3 ..6.95
Ecorse,Mich. G5 .....7.05
Fairfield,Ala. T2 .....6.95
Fontana,Calif. K1 ....8.025
Gary,Ind. U5 .....6.95
Houston S5 .....7.20
Ind.Harbor,Ind. I-2, Y1..6.95
KansasCity,Mo. S5 ....7.20
Lackawanna,N.Y. B2 ..6.95
LosAngeles(25) B3 ....7.70
Seattle(25) B3 .....7.95
Sharon,Pa. S3 .....6.95
S.SanFrancisco(25) B3..7.70
SparrowsPoint,Md. B2 ..6.95
Warren,O. R2 .....6.95
Weirton,W.Va. W6 ....6.95
Youngstown U5, Y1 ..6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ..4.925
Warren,O. R2 .....5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....6.85
Baltimore T6 .....6.85
Boston T6 .....7.40
Buffalo S40 .....6.85
Cleveland A7, J5 .....6.85
Conshohocken,Pa. A3 ..6.90
Dearborn,Mich. D3 ....6.95
Detroit D2, M1, P20 ..6.95
Detroit D1 .....6.85
Dover,O. O6 .....6.85
Ecorse,Mich. G5 .....6.90
Fultonshee,W.Va. F4 ...6.85
Fontana,Calif. K1 .....6.60
FranklinPark,Ill. T6 ....6.95
Ind.Harbor,Ind. Y1 ....6.85
Indianapolis C8 .....7.00
Lackawanna,N.Y. B2 ...6.25
LosAngeles C1 .....8.90
NewBedford,Mass. R10..7.30
NewBritain(10) B18 ....6.85
NewCastle,Pa. B4, E5 ..6.85
NewHaven,Conn. A7, D2 7.30
NewKensington,Pa. A6..6.85
Pawtucket,R.I. R3 .....7.50
Pawtucket,R.I. N8 .....7.40
Pittsburgh J5 .....6.85
Riverdale Ill. A1 .....6.95
Rome,N.Y. (32) R6 ....6.85
Sharon,Pa. S3 .....6.85
SparrowsPt,Md. B2 ....6.25
Trenton N.J.(31) R5 ...8.40
Wallingford,Conn. W2 ..7.30
Warren,O. R2, T5 .....6.85
Weirton,W.Va. W6 .....6.85
Worcester,Mass. A7 ....7.40
Youngstown C8, Y1 ....6.85

STRIP, Cold-Rolled Alloy

Boston T6 .....14.90
Carnegie,Pa. S18 .....14.55
Cleveland A7 .....14.55
Dover,O. O6 .....14.55
FranklinPark,Ill. T6 ...14.55
Harrison,N.J. C18 .....14.55
Indianapolis C8 .....14.70
Pawtucket,R.I. N8 .....14.90
Sharon,Pa. S3 .....14.55
Worcester,Mass. A7 ....14.85
Youngstown C8 .....14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.00
Dearborn,Mich. D3 ....10.10
Dover,O. O6 .....10.10
Ecorse,Mich. G5 .....10.10
Ind.Harbor,Ind. Y1 ...10.20
Lackawanna,N.Y. B2 ..9.10
Sharon,Pa. S3 .....10.00

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	8.50	10.10	12.90	15.30	18.25
Boston T6	8.50	10.10	12.90	15.30	18.25
Bristol,Conn. W1	...	...	12.90	15.30	18.25
Carnegie,Pa. S18	...	9.80	12.60	15.00	...
Cleveland A7	7.95	9.80	12.60	15.00	17.95
Cleveland C7	...	9.80	12.60	15.00	17.95
Dover,O. O6	7.95	9.80	12.60	15.00	17.95
Dover,O. D2	8.05	9.90	12.70	15.10	...
Detroit D1	*8.05*	*9.90*	*12.70*	...	...
Dover,O. O6	7.10	9.05	10.60	12.75	15.45
FranklinPark,Ill. T6	8.05	9.80	12.60	15.00	17.95
Harrison,N.J. C18	...	...	12.90	15.30	18.25
Indianapolis C8	*8.10*	*9.95*	*12.60*	*15.00*	*17.95*
NewBritain,Conn. (10) B18	7.95	9.80	12.60	15.00	17.95
NewCastle,Pa. B4, E5 ..	7.95	9.80	12.60	15.00	...
NewHaven,Conn. D2	8.40	10.10	12.90	15.30	...
NewKensington,Pa. A6 ..	7.95	9.80	12.60	15.00	...
New York W3	...	10.10	12.90	15.30	18.25
Pawtucket,R.I. N8	*8.50*	*10.10*	*12.90*	*15.30*	*18.25*
Riverdale,Ill. A1	8.05	9.90	12.60	15.00	17.95
Rome,N.Y. (32) R6	7.95	9.80	12.60	15.00	17.95
Sharon,Pa. S3	*7.95*	*9.80*	*12.60*	*15.00*	*17.95*
Trenton,N.J. R5	...	10.10	12.90	15.30	18.25
Wallingford,Conn. W2	8.40	10.10	12.90	15.30	18.15
Warren,O. T5	7.95	9.80	12.60	15.00	17.95
Weirton,W.Va. W6	7.95	9.80	12.60	15.00	17.95
Worcester,Mass. A7, T6..	8.50	10.10	12.90	15.30	18.25
Youngstown C8	...	...	*17.15*	*21.00*	*25.35*

Spring Steel (Tempered)			Up to 0.80c	0.81-1.05c	1.06-1.35c
Bristol,Conn. W1	...	...	16.80	20.65	...
Buffalo W12	...	...	16.80	...	...
FranklinPark Ill. T6	...	...	17.15	21.00	25.35
Harrison,N.J. C18	...	...	16.80	20.65	25.00
NewYork W3	...	...	16.80	20.65	25.00
Palmer,Mass. W12	...	...	16.80	...	...
Trenton,N.J. R5	...	...	16.80	20.65	25.00
Worcester,Mass. W12	...	...	14.80	...	...
Worcester,Mass. A7, T6..	...	...	16.80	20.65	25.00
Youngstown C8	7.95	9.80	12.60	15.00	17.95

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....7.60

STRIP, Electrogalvanized

Cleveland A7 .....6.85*
Dover,O. O6 .....6.85*
Riverdale,Ill. A1 .....6.95*
Warren,O. B9, T5 .....6.85*
Worcester,Mass. A7 ...7.40*
Youngstown C8 .....6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....6.975

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.40
Riverdale,Ill. A1 .....5.25
Sharon,Pa. S3 .....5.10
Youngstown U5 .....5.10

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10 ..	...	...	11.00	12.05	13.05
Brackenridge,Pa. A4	...	...	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. N9	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	...
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	...
Zanesville,O. A10	...	10.35	11.00	12.05	13.05

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*	12.275*	...
IndianaHarbor,Ind. I-2, Y1	9.20†	10.35*	11.025*	12.075*	...
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*	12.075*	13.05*
Vandergrift,Pa. U5	...	10.85†	11.525†	12.575†	13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4.	16.90	16.50	19.00	19.50	14.05**	
Butler,Pa. A10	....	....	18.80	19.00	19.50	....
Vandergrift,Pa. U5 ..	15.90	16.90	18.50	19.00	19.80	14.55**
Warren,O. R2	....	....	....	....	....	14.55†

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.30	$8.55	$8.95
Dravosburg,Pa. U5	8.30	8.55	8.95
Fairfield,Ala. T2	8.40	8.65	9.05
Fairless,Pa. U5	8.40	8.65	9.05
Fontana,Calif. K1	9.05	9.30	9.70
Gary,Ind. U5	8.30	8.55	8.95
GraniteCity,Ill. G4	8.40	8.65	9.05
IndianaHarbor,Ind. I-2, Y1	8.30	8.55	8.95
Niles,O. R2	8.30	8.55	8.95
Pittsburg,Calif. C11	9.05	9.30	9.70
SparrowsPoint,Md. B2	8.40	8.65	9.05
Weirton,W.Va. W6	8.30	8.55	8.95
Yorkville,O. W10	8.30	8.55	8.95
ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.975	....	....
Niles,O. R2	6.975	7.175	7.375

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.60	$9.85
Dravosburg,Pa. U5	9.60	9.85
Fairfield,Ala. T2	9.70	9.95
Fairless,Pa. U5..	9.70	9.95
Fontana,Calif. K1	10.35	10.60
Gary,Ind. U5....	9.60	9.85
Ind.Harbor Y1 ..	9.60	9.85
Pitts.,Calif. C11..	10.35	10.60
Sp.Pt.,Md. B2 ...	9.70	9.95
Weirton,W.Va. W6	9.60	9.85
Yorkville,O. W10.	9.60	9.85

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$7.40
Dravosburg,Pa. U5 ....7.40
Fairfield,Ala. T2 .....7.50
Fairless,Pa. U5 .....7.50
Fontana,Calif. K1 .....8.15
Gary,Ind. U5 .....7.40
GraniteCity,Ill. G4 ....7.50
Ind.Harbor,Ind. I-2, Y1.7.40
Niles,O. R2 .....7.40
Pittsburg,Calif. C11 ....8.15

SparrowsPoint,Md. B2		..7.50
Weirton,W.Va. W6		....7.40
Yorkville,O. W10		.....7.40
HOLLOWARE ENAMELING		
Black Plate (29 Gage)		
Dravosburg,Pa. U5		....7.15
Gary,Ind. U5		.....7.15
GraniteCity,Ill. G4		.....7.25
Ind.Harbor,Ind. Y1		....7.15
Yorkville,O. W10		.....7.15
MANUFACTURING TERNES		
(Special Coated; Base Box)		
Dravosburg,Pa. U5		....$9.10
Gary,Ind. U5		.....9.10
Yorkville,O. W10		.....9.10
MANUFACTURING TERNES		
(Light Coated, 6 lb; Base Box)		
Yorkville,O. W10		.....$9.55
ROOFING SHORT TERNES		
(8 lb Coated; Base Box)		
Gary,Ind. U5		.....$10.65

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..7.20
Aliquippa,Pa. J5 .....7.20
Alton,Ill. L1 .....7.40
Atlanta A11 .....7.40
Bartonville,Ill. K4 ....7.30
Buffalo W12 .....7.20
Chicago W13 .....7.20
Cleveland A7, C20 .....7.20
Crawfordsville,Ind. M8..7.30
Donora, Pa. A7 .....7.20
Duluth,Minn. A7 .....7.20
Fairfield,Ala. T2 .....7.20
Fostoria,O.(24) S1 .....7.30
Houston S5 .....7.45
Jacksonville,Fla. M8 ..7.55
Johnstown,Pa. B2 .....7.20
Joliet,Ill. A7 .....7.20
KansasCity,Mo. S5 ....7.45
Kokomo,Ind. C16 .....7.30
LosAngeles B3 .....8.15
Minnequa,Colo. C10 ....7.45
Monessen,Pa. P7, P16 ..7.20
N.Tonawanda B11 .....7.20
Palmer,Mass. W12 ....7.50
Pittsburg,Calif. C11 ....8.15
Portsmouth O. P12 .....7.20
Rankin,Pa. A7 .....7.20
S.Chicago,Ill. R2 .....7.20
S.SanFrancisco C10 ....8.15
SparrowsPoint,Md. B2..7.30
Sterling,Ill.(1) N15 ....7.20
Sterling,Ill. N15 .....7.30
Struthers,O. Y1 .....7.20
Waukegan,Ill. A7 .....7.20
Worcester, Mass. A7 ..7.50

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....8.725
Alton,Ill. L1 .....8.925
Bartonville,Ill. K4 ....8.825
Buffalo W12 .....8.725
Cleveland A7 .....8.725
Donora,Pa. A7 .....8.725
Duluth,Minn. A7 .....8.725
Fostoria,O. S1 .....8.775
Johnstown,Pa. B2 .....8.725
LosAngeles B3 .....9.675
Milbury,Mass.(12) N6..9.025
Minnequa,Colo. C10....8.975
Monessen,Pa. P7, P16..8.725
Muncie,Ind. I-7 .....8.925
Palmer,Mass. W12 .....9.025
Pittsburg,Calif. C11 ....9.675
Portsmouth,O. P12 .....8.725
Roebling,N.J. R5 .....9.025
S.Chicago,Ill. R2 .....8.725
S.SanFrancisco C10 ...9.675
SparrowsPt.,Md. B2 ...8.825
Struthers,O. Y1 .....8.725
Trenton,N.J. A7 .....9.025
Waukegan,Ill. A7 ....8.725
Worcester J6 .....9.025
Worcester,Mass. A7, T6 9.025

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....8.40
Alton,Ill. L1 .....8.60
Buffalo W12 .....8.40
Cleveland A7 .....8.40
Donora,Pa. A7 .....8.40
Duluth,Minn. A7 .....8.40
Johnstown,Pa. B2 .....8.40
KansasCity,Mo. S5 ....8.65
LosAngeles B3 .....9.35
Minnequa,Colo. C10 ....8.60
Monessen,Pa. P7, P16..8.40
Newhaven,Conn. A7 ...8.70
Palmer,Mass. W12 ....8.70
Pittsburg,Calif. C11 ....9.35
Portsmouth O. P12 .....8.40
Roebling,N.J. R5 .....8.70
S.Chicago,Ill. R2 .....8.40
S.SanFrancisco C10 ....9.35
SparrowsPoint,Md. B2 ..8.50
Struthers,O. Y1 .....8.40
Trenton,N.J. A7 .....8.70
Waukegan,Ill. A7 .....8.40
Worcester,Mass. A7 ....8.70

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....14.35
Bartonville,Ill. K4 ....12.65
Buffalo W12 .....14.15
Chicago W13 .....13.55
Cleveland A7 .....14.15
Crawfordsville,Ind. M8.14.25
Fostoria,O. S1 .....14.15
Jacksonville,Fla. M8 ..14.50
Johnstown,Pa. B2 .....14.15
Kokomo,Ind. C16 .....14.15
Minnequa,Colo. C10 ....13.90
Monessen,Pa. P6 .....14.15
Muncie,Ind. I-7 .....14.35
Palmer,Mass. W12 .....14.45
Roebling,N.J. C10 .....14.45
S.SanFrancisco C10 ....14.50
Waukegan,Ill. A7 .....14.15
Worcester,Mass. A7,T6.14.45

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4 ....10.70
Buffalo W12 .....11.75
Johnstown,Pa. B2 .....11.75
Minnequa,Colo. C10 ...11.875
Monessen,Pa. P16 .....11.75
Muncie,Ind. I-7 .....11.95
Palmer,Mass. W12 .....12.05
Pittsburg,Calif. C11 ....12.55
Portsmouth,O. P12 .....11.75
Roebling,N.J. R5 .....12.05
SparrowsPt.,Md. B2 ...11.85
Struthers,O. Y1 .....11.75

ROPE WIRE (A)

Bartonville,Ill. K4 ....10.55
Buffalo W12 .....11.55
Fostoria,O. S1 .....11.55
Johnstown,Pa. B2 .....11.55
Monessen,Pa. P7, P16..11.55
Muncie,Ind. I-7 .....11.75
Palmer,Mass. W12 .....11.85
Portsmouth,O. P12 .....11.35
Roebling,N.J. R5 .....11.85
SparrowsPt. B2 .....11.65
Struthers,O. Y1 .....11.35
Worcester,Mass. J6 .....11.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4 ....14.15
Monessen,Pa. P16 ....14.45
Roebling,N.J. R5 ....14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6 ....10.75
Baltimore T6 ....11.05
Boston T6 ....11.05
Buffalo W12 ....10.75
Cleveland A7 ....10.75
Crawfordsville,Ind. M8 10.75
Dover,O. G6 ....10.75
Fostoria,O. S1 ....10.75
FranklinPark,Ill. T6 ....10.85
Kokomo,Ind. C16 ....10.75
Massillon,O. R8 ....10.75
Milwaukee C23 ....10.95
Monessen,Pa. P7, P16 ..10.75
NewKensington,Pa. A6 10.75
Palmer,Mass. W12 ....11.05
Pawtucket,R.I. N8 ....11.05
Riverdale,Ill. A1 ....10.85
Rome,N.Y. R6 ....10.75
Trenton,N.J. R5 ....11.06
Worcester A7, T6 ....11.06

NAILS, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	...167
Aliquippa,Pa. J5	167
Atlanta A11	169
Bartonville,Ill. K4	169
Chicago,Ill. W13	167
Cleveland A9	173
Crawfordsville,Ind. M8	..169
Donora,Pa. A7	167
Duluth,Minn. A7	167
Fairfield,Ala. T2	167
Houston,Tex. S5	172
Jack'ville,Fla.(20) M8	..178
Johnstown,Pa. B2	169
Joliet,Ill. A7	167
KansasCity,Mo. S5	172
Kokomo,Ind. C16	169
Minnequa,Colo. C10	172
Monessen,Pa. P7	167
Pittsburg,Calif. C11	166
Rankin,Pa. A7	167
S.Chicago,Ill. R2	167
SparrowsPt.,Md. B2	169
Sterling,Ill.(1) N15	167
Worcester,Mass. A7	173
(To Wholesalers; per cwt)	
Galveston,Tex. D7	...8.75

NAILS, Cut (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	..$9.80
Wheeling,W.Va. W10	..9.80

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	..167
Aliquippa,Pa. J5	167
Atlanta A11	169
Bartonville,Ill. K4	169
Crawfordsville,Ind. M8	..169
Donora,Pa. A7	167
Duluth,Minn. A7	167
Fairfield,Ala. T2	167
Jack'ville,Fla.(20) M8	..178
Johnstown,Pa. B2	169
Joliet,Ill. A7	167
Kokomo,Ind. C16	169
Minnequa,Colo. C10	172
Monessen,Pa. P7	167
Pittsburg,Calif. C11	166
Rankin,Pa. A7	167
S.Chicago,Ill. R2	167
SparrowsPt.,Md. B2	169
Sterling,Ill.(1) N15	167
Worcester,Mass. A7	173

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity, Ala. R2	$10.03
Bartonville,Ill. K4	...10.13
Buffalo W12	....10.05
Crawfordsville,Ind. M8	.10.13
Donora,Pa. A7	....10.03
Duluth,Minn. A7	....10.03
Jacksonville,Fla. M8	.10.58
Johnstown, Pa. B2	....10.03
Joliet,Ill. A7	....10.03
Kokomo,Ind. C16	....10.13
LosAngeles B3	....10.82
Minnequa,Colo. C10	....10.28
Pittsburg,Calif. C11	..10.81
S.Chicago,Ill. R2	....10.03
S.SanFrancisco C10	....10.81
SparrowsPt.,Md. B2	....10.13
Sterling,Ill. N15	....10.03
Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$10.35
Bartonville,Ill. K4	...10.45
Buffalo W12	....10.35
Crawfordsville,Ind. M8	10.45
Donora,Pa. A7	....10.35
Duluth,Minn. A7	....10.35
Jacksonville,Fla. M8	..10.91
Johnstown,Pa. B2	....10.35
Joliet,Ill. A7	....10.35
Kokomo,Ind. C16	....10.45
LosAngeles B3	....11.15
Minnequa,Colo. C10	....10.60
Pittsburg,Calif. C11	..11.15
S.Chicago,Ill. R2	....10.35
S.SanFrancisco C10	....11.15
SparrowsPt.,Md. B2	....10.45
Sterling,Ill. N15	.....10.35

Coil Interim

AlabamaCity,Ala. R2	$10.40
Bartonville,Ill. K4	....10.50
Buffalo W12	....10.40
Crawfordsville,Ind. M8	10.50
Donora,Pa. A7	....10.40
Duluth,Minn. A7	....10.40
Jacksonville,Fla. M8	..10.96
Johnstown,Pa. B2	....10.40
Joliet,Ill. A7	....10.40
Kokomo,Ind. C16	....10.50
LosAngeles B3	....11.34
Minnequa,Colo. C10	..10.65
Pitts.,Calif. C11	....11.20
S.Chicago,Ill. R2	....10.40
S.SanFrancisco C10	....11.20
SparrowsPt.,Md. B2	..10.50
Sterling,Ill. N15	....10.40

WIRE, Barbed Col.

AlabamaCity,Ala. R2	.187**
Aliquippa,Pa. J5	....184‡
Atlanta A11	193
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	..193
Donora,Pa. A7	....187†
Duluth,Minn. A7	....187†
Fairfield,Ala. T2	....187†
Houston,Tex. S5	....192**
Jacksonville,Fla. M8	..198
Johnstown,Pa. B2	....191*
Joliet,Ill. A7	....187†
KansasCity,Mo. S5	..192**
Kokomo,Ind. C16	....189†
Minnequa,Colo. C10	..192**
Monessen,Pa. P7	....191*
Pittsburg,Calif. C11	....207†
Rankin,Pa. A7	....187†
S.Chicago,Ill. R2	....187**
S.SanFrancisco C10	..207**
SparrowsPoint,Md. B2	.193*
Sterling,Ill.(1) N15	...191*

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	....181**
Aliq'ppa,Pa. 9-14½ga. J5	184‡
Atlanta A11	187
Bartonville,Ill. K4	187
Crawfordsville,Ind. M8	187
Donora,Pa. A7	....181†
Duluth,Minn. A7	....181†
Fairfield,Ala. T2	....181†
Houston,Tex. S5	....186**
Jacksonville,Fla. M8	...192
Johnstown,Pa.(43) B2	..185
Joliet,Ill. A7	....181†
KansasCity,Mo. S5	....186**
Kokomo,Ind. C16	....183†
Minnequa,Colo. C10	....186**
Monessen,Pa. 9 ga. P7	185*
Pittsburg,Calif. C11	....204†
Rankin,Pa. A7	....181†
S.Chicago,Ill. R2	....181**
Sterling,Ill.(1) N15	....185*

WIRE (16 Gage) Stone Stone

	An'ld	Galv.
Ala.City R2	..16.10	17.65**
Bartonville K4	..16.10	18.05
Buffalo W12	....16.10	....
Cleveland A7	....	16.10
Crawf'dsville M8	16.20	18.15
Fostoria,O. S1	..16.20	17.75†
Jacksonville M8	..16.45	18.40
Johnstown B2	..16.10	18.05*
Kokomo C16	..16.20	17.75†
Minnequa C10	..16.45	18.15**
P'lm'r,Mass.W12	16.10	17.65*
Pitts.,Calif. C11	14.85	16.40†
SparrowsPt. B2	16.20	18.15*
Sterling(1) N15	16.10	18.05*
Waukegan A7	..16.10	17.65
Worcester A7	....16.40	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	8.10	8.50**
Aliquippa J5	....8.10	8.625‡
Atlanta A11	....8.20	8.80
Bartonville(43) K4	8.20	8.80
Buffalo W12	....8.10	8.50†
Cleveland A7	....8.10	....
Crawfordsville M8	8.20	8.80
Donora,Pa. A7	....8.10	8.50†
Duluth,Minn. A7	....8.10	8.50†
Fairfield T2	....8.10	8.50†
Houston(48) S5	..8.35	8.75**
Jacks'ville,Fla. M8	8.45	9.05
Johnstown B2(48)	8.10	8.70*
Joliet,Ill. A7	....8.10	8.50†
Kans.City(48) S5	8.35	8.75**
Kokomo C16	....8.20	8.60†
LosAngeles B3	..9.05	9.65*
Minnequa C10	..8.35	8.75**
Monessen P7 (48)	8.10	8.70*
Palmer,Mass. W12	8.40	8.80†
Pitts. Calif. C11	..9.05	9.45†
Portsmouth,O. P12	*8.10*	
Rankin,Pa. A7	....8.10	8.50†
S.Chicago R2	....8.10	8.50**
S.SanFran. C10	..9.05	9.45**
SparrowPt. B2(48)	8.20	8.80*
Str'ling(1)(48) N15	8.10	8.70*
Struth'rs,O.(48) Y1	8.10	8.60‡
Worcester,Mass. A7	8.40	8.80†

*Based on zinc price of: *12.50c, †5c, ‡10c, ‡‡Less than 10c, †††3c. **Subject to zinc equalization extras.

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	...195
Atlanta A11	197
Bartonville,Ill. K4	197
Crawfordsville,Ind. M8	..197
Donora,Pa. A7	195
Duluth,Minn. A7	195
Fairfield,Ala. T2	195
Jacksonville,Fla. M8	...202
Joliet,Ill. A7	195
Houston S5	200
KansasCity,Mo. S5	200
Kokomo,Ind. C16	197
Minnequa,Colo. C10	200
Pitts.,Calif. C11	199
S.Chicago R2	195
S.SanFran.,Calif. C10	...219
SparrowsPoint,Md. B2	...197
Sterling,Ill.(1) N15	195

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	167
Duluth,Minn. A7	167
Franklin,Pa. F5	167
Huntington,W.Va. W7	...169
Johnstown,Pa. B2	167
Marion,O. P11	157
Minnequa,Colo. C10	172
Moline,Ill. R2	172
S.Chicago,Ill. R2	167
Sterling,Ill. N15	*167*
Terre Haute,Ind. T. B12	...169
Williamsport,Pa. S19	...175

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)
½ in. and smaller:
6 in. and shorter.... 55
Longer than 6 in. .. 46.5
⅝ in. thru 1 in.:
6 in. and shorter.... 48.5
Longer than 6 in. .. 44
1¼ in. and larger:
All lengths 44

Undersized Body (rolled thread)
½ in. and smaller:
6 in. and shorter... 55

Carriage, Machine Lag Bolts
Hot Galvanized:
½ in. and smaller:
6 in. and shorter ... 35
Longer than 6 in. .. 23
⅝ in thru 1 in.:
6 in. and shorter .. 20
Longer than 6 in. .. 20
1¼ in. and larger:
All lengths 20

Lag Bolts
All diameters:
6 in. and shorter..... 50
Longer than 6 in. 47

Plow and Tap Bolts
½ in. and smaller by 6 in. and shorter 54
Larger than ½ in. or longer than 6 in. 47

Blank Bolts 47
Step, Elevator, Tire Bolts 54

NUTS

Reg. & Heavy Square Nuts:
All sizes 39
Square Nuts, Reg. & .....
Heavy, Hot Galvanized:
All sizes 45

Hex Nuts, Reg. & Heavy, Hot Pressed:
⅝ in. and smaller.. 62
⅝ in. to 1 in. incl.. 59.5
1⅛ in. to 1½ in., incl. 64
1⅝ in. and larger... 58

Hex Nuts, Reg. & Heavy, Cold Punched:
⅝ in. and smaller.. 63
⅝ in. to 1⅛ in., incl. 59.5
1⅛ in. and larger.. 56

Hex Nuts, All Types, Hot Galvanized:
⅝ in. and smaller.. 50
⅝ in. to 1 in., incl. 46
1⅛ in. to 1½ in., incl. 51

Hex Nuts, Semifinished, Reg. & Heavy (Incl. slotted):
⅝ in. and smaller.. 62
⅝ in. to 1⅛ in., incl. 59.5
1⅛ in. and larger.. 58

Hex Nuts, Finished (Incl. slotted and Castellated):
1 in. and smaller... 65
1⅛ in. to 1½ in., incl. 62
1⅝ in. and larger.. 58
(Base discounts, packages, per cent off list, f.o.b. mill)

CAP AND SET SCREWS

Hex Head Cap Screws, Coarse or Fine Thread Bright:
6 in. and shorter:
⅝ in. and smaller.. 47
⅝, ⅞ and 1 in., diam. 31
Longer than 6 in.:
⅝ in. and smaller.. 18.5
⅝, ⅞ and 1 in. diam. 55

High Carbon, Heat Treated:
6 in. and shorter:
⅝ in. and smaller.. 34
⅝, ⅞ and 1 in. diam. 13
Longer than 6 in.:
⅝ in. and smaller.. +1
⅝, ⅞ and 1 in. diam. ..... +19

Fillister Head, Coarse Thread:
Listed Sizes ..... +31

Flat Head, Coarse Thread:
¼ in. and smaller by 6 in. and shorter.. +57

Set Screws, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:
6 in. and shorter .. 11
Longer than 6 in.... +10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 10.85
⅞-in. under List less 26.5%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D.	B.W.	Seamless		Elec. Weld
In.	Gage	H.R.	C.D.	H.R.
1	13	....	23.56	22.84
1¼	13	....	27.92	22.68
1½	13	26.34	30.84	28.06
1¾	13	31.12	36.45	29.64
2	13	34.68	40.85	33.21
2¼	13	39.29	46.01	37.42
2½	12	42.64	49.94	40.61
2¾	12	46.98	55.01	44.73
2½	12	50.86	59.57	48.44
3	12	54.24	63.53	51.66

RAILWAY MATERIALS

	Standard			Tee Rails
			All	60 lb
RAILS	No. 1	No. 2	No. 2	Under
Bessemer,Pa. U5	5.075	4.975	5.025	6.00
Ensley,Ala. T2	5.075	4.975	....	6.00
Fairfield,Ala. T2	....	....	....	6.00
Gary,Ind. U5	5.075	4.975	5.025	....
Huntington,W.Va. W7	....	....	....	6.15
Indiana Harbor,Ind. I-2	5.075	4.975	5.025	....
Johnstown,Pa. B2	....	....	....	...(16)6.00
Lackawanna,N.Y. B2	4.975	5.075	....	...(16)6.00
Minnequa,Colo. C10	5.075	4.975	....	6.50
Steelton,Pa. B2	5.075	4.975	....	....
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	....6.025
Gary,Ind. U5	....6.025
Ind.Harbor,Ind. I-2	...6.025
Lackawanna,N.Y. B2	..6.025
Minnequa,Colo. C10	...6.025
Seattle B3	....6.175
Steelton,Pa. B2	....6.025
Torrance,Calif. C11	...6.175

TRACK BOLTS, Untreated

Cleveland R2	....13.10
Lebanon,Pa. B2	....13.10
Minnequa,Colo. C10	...13.10
Pittsburgh P14	....13.10
Seattle B3	....13.60

*Treated

AXLES

Ind.Harbor,Ind. B13	...8.10
Johnstown,Pa. B2	....8.10

JOINT BARS

Bessemer,Pa. U5	....6.35
Fairfield,Ala. T2	....6.35
Ind.Harbor,Ind. I-2	...6.35
Joliet,Ill. U5	....6.35
Lackawanna,N.Y. B2	...6.35
Minnequa,Colo. C10	...6.35
Steelton,Pa. B2	....6.35

SCREW SPIKES

Cleveland R2	....12.85
Pittsburgh P14	....12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	....8.775
Ind.Harbor,Ind. I-2, Y1	8.775
KansasCity,Mo. S5	....8.775
Lebanon,Pa. B2	....8.775
Minnequa,Colo. C10	...8.775
Pittsburgh J5	....8.775
Seattle B3	....9.275
S.Chicago,Ill. R2	....8.775
Struthers,O. Y1	....8.775
Youngstown R2	....8.775

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 0.23c; 1 15/16 to 8 in., inclusive, 6.6%.
(6) Chicago or Birm. base.
(7) To jobbers, 5 cents lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.142 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) ¾ in and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) Special quality
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.50c, for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(38) 14 Ga. & lighter; 40" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.655" and heavier, 0.25c higher.
(41) 0.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. to mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(46) 6-7 Ga.
(49) ⅝-in. and smaller rounds; 7.95c over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches			2½		3		3½		4		5		6	
List Per Ft			55.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft			5.82		7.62		9.20		10.89		14.81		19.16	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Ambridge, Pa. N2	+2	....	4.5	....	7	....	8.5	....	8.5	....	8.25	....	10.75	....
Lorain, O. N3	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Youngstown Y1	0.5	+17.5	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches			¼		⅜		½		⅝		¾		1		1¼	
List Per Ft			5.5c		6c		8.5c		11.5c		17c		23c			
Pounds Per Ft			0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Alton, Ill. L1	....	....	....	....	....	....	10.5	+3.75	13.5	+4.75	16	+1.25	18.5	0.5
Benwood, W. Va. W10	10	+20.5	+0.25	+27.75	+9.75	+37.25	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Butler, Pa. P8	10	+20.5	0.5	+27	+8.5	+36	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Fairless, Pa. N3	....	....	....	....	....	....	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Fontana, Calif. K1	....	....	....	....	....	....	0	+19.25	3	+15.25	5.5	+11.75	8	+10
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	11.5	+7.75	14.5	+3.75	17	+0.25	19.5	1.5
Lorain, O. N3	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sharon, Pa. S4	11	+19.5	1.5	+26	+7.5	+35	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sparrows Pt., Md. B2	16	+12.5	7.5	+18	+0.5	+25	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Wheatland, Pa. W9	16	+12.5	9.5	+18	1.5	+26	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Youngstown R2, Y1	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5

Size—Inches			1½		2		2½		3		3½		4	
List Per Ft			27.5c		37c		55.5c		76.5c		92c		$1.09	
Pounds Per Ft			2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....	....	....
Alton, Ill. L1	19	1.5	19.5	2	21	2.75	21	2.75	....	....	....	....	....	....
Benwood, W. Va. W10	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+0.75	13.5	+5.25	13.5	+5.25
Etna, Pa. N2	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25	13.5	+5.25
Fairless, Pa. N3	19	1.5	19.5	2	21	2.75	21	2.75	11.5	+7.25	11.5	+7.25	11.5	+7.25
Fontana, Calif. K1	8.5	+9	9	+8.5	10.5	+7.75	10.5	+7.75	1	+17.75	1	+17.75	1	+17.75
Indiana Harbor, Ind. Y1	20	2.5	20.5	3	22	3.75	22	3.75	12.5	+6.25	12.5	+6.25	12.5	+6.25
Lorain, O. N3	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....	....	....
Sharon, Pa. M6	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....	....	....
Sparrows Pt., Md. B2	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25	17.5	+0.25
Wheatland, Pa. W9	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75	19.5	0.75
Youngstown R2, Y1	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25	13.5	+5.25

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Sinks	Forging Billets	Seamless Tube Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	19.75	24.50	....	....	33.00	....	....	....	45.00	41.50
202	21.00	27.25	33.00	....	35.75	....	39.25	41.25	45.25	45.25
301	20.50	25.25	33.75	....	34.00	38.50	40.50	42.50	47.25	43.75
302	22.00	28.00	34.00	....	36.75	38.75	40.75	43.00	47.50	47.50
302B	21.75	28.25	35.25	....	40.25	38.75	40.75	43.00	50.00	50.00
303	....	28.50	37.00	....	....	41.75	43.75	45.50	52.00	52.00
304	23.25	29.25	36.00	....	39.75	41.00	43.00	45.75	50.25	50.25
304L	....	....	43.00	....	46.75	48.50	50.50	53.25	57.75	57.75
305	24.75	32.50	37.75	....	43.00	41.00	43.00	46.25	53.50	53.50
308	26.75	34.00	42.50	....	45.50	48.25	50.50	55.00	57.50	57.50
309	34.75	44.00	51.50	....	58.50	57.75	60.50	64.25	73.50	73.50
310	42.50	53.75	69.00	....	75.50	77.75	81.50	83.25	87.00	87.00
314	....	....	....	....	....	77.75	....	83.25	....	....
316	35.25	44.50	56.25	....	63.50	63.75	66.75	70.25	74.75	74.75
316L	....	....	62.75	....	70.00	71.25	74.25	77.75	82.25	82.25
317	43.00	54.50	70.00	....	81.50	79.75	83.50	86.25	93.25	93.25
321	28.25	35.75	42.25	....	48.75	48.00	50.25	54.50	60.00	60.00
18-8CbTa	32.75	42.00	50.25	....	58.25	56.25	59.00	63.75	73.00	73.00
403	....	....	30.75	....	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	....	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	....	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	....	40.25	38.00	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	....	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	....	32.00	33.50	35.25	49.75	49.75
431	....	27.25	35.50	....	....	39.75	41.75	43.50	53.00	53.00
446	....	....	37.75	....	56.75	42.75	44.75	46.00	67.25	60.00

Stainless Steel Producers Are. Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets Carbon Base 20%
302	....	....	33.25
304	34.50	41.50	35.25
304-L	37.20	44.65	....
316	38.70	46.65	52.25
316-L	45.70	54.35	....
316-CB	45.90	54.75	....
321	36.35	43.40	42.00
347	39.50	48.45	51.00
405	29.20	37.05	....
410	28.70	36.55	....
430	28.70	36.55	....
Inconel	52.50	68.45	....
Nickel	44.10	58.65	....
Nickel, Low Carbon	46.30	63.15	....
Monel	47.09	62.55	....
Copper*	....	....	46.00

	Strip, Carbon Base, Cold Rolled 10%	Strip, Carbon Base, Cold Rolled Both Sides
Copper*	33.60	41.40

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.043-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.530

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.7575
18	4	2	....	....	1.845
18	4	1	....	....	1.680
9	3.5	..	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross tons, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50	58.00‡	63.00	....
Cincinnati, deld.	....	58.70	....	....
Buffalo District				
Buffalo H1, R2	62.50	63.00	63.50	64.00
Tonawanda,N.Y. W12	62.50	63.00	63.50	64.00
N.Tonawanda,N.Y. T9	....	63.00	63.50	64.00
Boston, deld.	73.79	74.29	74.79	....
Rochester,N.Y., deld.	65.52	66.02	66.52	....
Syracuse,N.Y., deld.	66.62	67.12	67.62	....
Chicago District				
Chicago I-3	62.50	63.00	63.00	63.50
Gary,Ind. U5	62.50	....	63.00	....
S.Chicago,Ill. R2	62.50	....	63.00	....
S.Chicago,Ill Y1	62.50	63.00	63.00	....
S.Chicago U5	62.50	....	63.00	63.50
S.Chicago,Ill. W14	62.50	....	63.00	63.50
Milwaukee deld.	64.80	65.30	65.30	65.80
Muskegon,Mich. deld.	....	69.68	69.68	....
Cleveland District				
Cleveland R2, A7	62.50	63.00	63.00	63.50
Akron,O., deld.	65.25	65.75	65.75	66.25
Mid-Atlantic District				
Bethlehem,Pa. B2	64.50	65.00	65.50	66.00
New York, deld	....	69.01	69.51	....
Newark, deld.	67.70	68.20	68.70	69.20
Birdsboro,Pa. B10	64.50	65.00	65.50	66.00
Chester,Pa. P4	64.50	65.00	65.50	....
Philadelphia, deld.	66.28	66.78	67.28	....
Steelton,Pa. B2	64.50	65.00	65.50	66.00
Swedeland,Pa. A3	64.50	65.00	65.50	66.00
Philadelphia, deld.	66.28	66.78	67.28	67.78
Troy,N.Y. R2	64.50	65.00	65.50	66.00
Pittsburgh District				
NevilleIsland,Pa. P6	62.50	63.00	63.00	63.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	64.45	64.45	64.95
McKeesRocks, deld.	....	64.10	64.10	64.63
Lawrenceville, Homestead, Wilmerding,Monaca, deld.	....	64.78	64.78	65.29
Verona,Trafford, deld.	64.79	65.32	65.32	65.85
Brackenridge, deld.	65.10	65.60	65.60	66.13
Bessemer,Pa. U5	62.50	....	63.00	63.50
Clairton,Rankin,S.Duquesne,Pa. U5	62.50	....	....	....
Midland,Pa. C18	62.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	63.00	....
Sharpsville,Pa. S6	62.50	....	63.00	63.50
Youngstown Y1	....	....	63.00	63.50
Mansfield,O. deld.	67.40	....	67.90	68.40
Duluth I-3	62.50	63.00	63.00	63.50
Erie,Pa. I-3	62.50	63.00	63.00	63.50
Everett,Mass. E1	63.25	63.75	64.25	....
Fontana,Calif. K1	70.00	70.50	....	....
Geneva,Utah C11	62.50	63.00	....	....
GraniteCity,Ill. G4	61.90	62.40	62.90	....
Ironton,Utah C11	62.50	63.00	....	....
Lone Star,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	64.50	65.00	65.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	62.50	63.00	63.00	63.50
Cincinnati, deld.	66.26	66.76	....	....

*Phos. 0.51-0.75%; $50, Phos. 0.31-0.50%.
‡Phos. 0.70-0.90; intermediate (Phos. 0.31-0.50%), $60.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $3 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	71.50
Buffalo H1	72.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$92.50
Keokuk,Iowa, Open-hearth & Fdry. (freight allowed K2)	97.00
Keokuk, O. H. & Fdry, 12¼ lb pigiets, 1/4% Si, frgt allowed K2	100.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$76.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	76.50
Steelton,Pa. B2 (Phos. 0.035% max)	70.50
Philadelphia, deld.	74.05
Troy,N.Y. R2 (Phos. 0.035% max)	70.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	67.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, Spokane, 10 cents; Atlanta, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Merchant Qual.	H.R. Spec. Qual.	C.F. Rds.‡	H.R. Alloy 4140††		Carbon	Floor
Atlanta	8.07§	9.27§	9.83§	....	8.16	8.30	...	10.14	....	8.44	8.40	10.22
Baltimore	7.79	8.99	9.12	....	8.27	8.34	8.87	9.09¹	15.69	8.57	8.12	9.56
Birmingham	7.68§	8.88§	8.85§	....	7.78	7.91	8.44	10.04	....	8.05	8.01	10.04
Boston	8.70	9.73	10.92	....	8.79	8.98	9.43	10.71	14.46	8.90	8.98	10.39
Buffalo	7.75	8.90	10.72	....	8.00	8.00	8.70	8.70	14.30	8.25	8.25	9.80
Chattanooga	7.90§	9.10§	9.10§	....	8.00	8.13	8.66	9.96	....	8.27	8.23	9.98
Chicago	7.70	8.90	9.70	....	7.78	7.91	8.44	8.35	13.95	8.05	8.01	9.26
Cincinnati	7.82	8.89	9.70	....	8.06	8.19	8.72	8.82	14.23	8.55	8.34	9.53
Cleveland	7.68	8.88	9.60	....	7.88	7.99	8.52	8.60	14.03	8.38	8.21	9.46
Denver	9.55	11.09	12.41	....	9.70	9.75	...	10.54	18.89	9.60	9.50	11.15
Detroit	7.91	9.13	10.02	....	8.10	8.18	8.71	8.68	14.19	8.55	8.33	9.49
Erie, Pa.	7.75	8.88	9.60¹⁰	....	7.90	8.00	8.65	8.70¹⁰	....	8.35	8.20	9.50
Houston	8.70	9.65	10.99	....	8.80	8.95	9.50	10.70	15.00	9.40	9.10	10.60
Jackson, Miss.	8.00§	9.20§	9.22§	....	8.10	8.23	8.76	10.14	....	8.37	8.33	10.08
Los Angeles	8.90	10.65	11.65	....	9.10	8.80	9.50	11.70	15.25	8.95	9.35	11.50
Milwaukee	7.82	9.02	9.82	....	7.90	8.03	8.56	8.57	14.07	8.24	8.13	9.37
Moline, Ill.	7.48	8.59	9.45	....	7.56	7.62	...	8.10	....	7.78	7.80	...
New York	8.35	9.53	10.23	57.73	8.51	8.83	9.38	10.61	14.37	8.74	8.78	10.05
Norfolk, Va.	7.85	...	...	....	8.30	8.35	...	10.80	....	8.60	8.10	9.60
Philadelphia	7.89	9.08	10.12	....	8.58	8.37	8.90	9.12	14.15	8.38	8.28	9.37
Pittsburgh	7.68	8.88	10.05	50.00	7.88	7.91	8.44	8.60	13.95	8.05	8.01	9.26
Portland, Oreg.	8.95	9.65	11.40	....	9.05	8.95	...	13.55	14.60	8.90	8.70	11.60
Richmond, Va.	8.05	..	10.09	....	8.45	8.70	9.20	10.00	....	8.80	8.35	9.70
St. Louis	8.02	9.21	10.03	....	8.11	8.25	8.78	8.93	14.28	8.48	8.34	9.59
St. Paul	7.83	8.78	9.80	....	7.91	7.97	...	8.70	....	8.13	8.15	9.42
San Francisco	8.75	10.30	10.80	....	8.95	8.80	9.35	12.30	15.25	8.85	8.85	11.15
Seattle	9.35	11.20	11.55	....	9.50	9.30	9.85	13.15	15.55	9.15	9.05	11.25
Spokane, Wash.	9.35	11.35	11.55	....	9.50	9.30	9.85	13.15	16.30	9.15	9.05	11.25
Washington	8.31	10.43	...	....	8.99	8.74	...	9.90	....	9.62	8.64	11.10

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); §includes 25-cent bar quality extras; **⅝-in. and heavier; ††as annealed; §42 in. and under.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 5000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; ¹—400 to 999 lb; ¹⁰—2000 to 3999 lb; ¹⁸—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stephens Pottery, Ga., $175.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angeles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $230.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $275; Philadelphia, Clearfield, Pa., $285.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $315; Philadelphia, Clearfield, Pa., $325.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $292; Clearfield, Pa., $311.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $236.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Nario, O., $16; Thornton McCook, Ill. $15.60; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ⅛-in. grains with fines: Chewelah, Wash., $43; Luning, Nev., $43. ⅝-in. grains with fines: Baltimore, $69.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	33.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$32.50-33.00
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, contracts, nominally $1.35-1.40, per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47% $1.10-1.15. Spot cargoes, 10 to 15% higher.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 3:1 O	$52.00-53.50
48% 2.8:1	nom. 49.00-50.00
48% no ratio	39.00-40.00

South African Transvaal

48% no ratio	$35.00-36.00
44% no ratio	25.00-26.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per unit of lb content, c.i.f. seaboard

55-60%	$3.35-3.80
60-65%	3.80-3.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge iron:	
Swedish, c.i.f., Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b. Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b. Riverton, N.J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe, 325 mesh	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, $6.00-275.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb, drum frght, allowed	
Carlots	36.20
Ton lots	38.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	39.75-51.00†
Bronze, 5000-lb lots	61.25-65.00†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	76.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	59.25-62.25†
Phosphor-Copper, 5000-lb lots	67.00
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc 5000-lb lots	19.75-33.00‡
Tungsten:	Dollars
Melting grade, 99%	
60 to 200 mesh:	
1000 lb and over	4.50
Less than 1000 lb	4.65
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. 70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5½	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25

CARBON

8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

Imported Steel

(Base per 100 lb, landed, duty paid. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.05	$7.05	$7.05	$7.45
Bar Size Angles	6.90	6.90	6.90	7.30
Structural Angles	7.45	7.45	7.45	7.85
I-Beams	7.65	7.65	7.65	8.05
Plates	8.90	8.90	8.90	9.30
Sheets, H.R.	8.75	8.75	8.75	9.15
Sheets, C.R. (drawing quality)	9.10	9.10	9.10	9.45
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	28.50	28.50	28.50	30.46
Barbed Wire (†)	6.50	6.50	6.50	6.85
Merchant Bars	7.00	7.00	7.00	7.40
Hot-Rolled Bands	7.50	7.50	7.50	7.90
Wire Rods, Thomas Commercial No. 5	6.50	6.50	6.50	6.90
Wire Rods, O-H Cold Heading Quality No. 5	6.90	6.90	6.90	7.30
Bright Common Wire Nails	7.80	7.80	7.80	8.10

Oil Country Pipe: Mills withdrawn for remainder of the year.

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.25-14.75
Connellsville, foundry	17.00-18.00

Oven Foundry Coke

Birmingham, ovens	$27.60
Cincinnati, deld.	32.53
Buffalo, ovens	29.50
Camden, N. J., ovens	28.50
Detroit, ovens	29.50
Pontiac, deld.	31.15
Saginaw, deld.	32.73
Erie Pa., ovens	27.50
Everett, Mass., ovens	
New England, deld.	30.55*
Indianapolis, ovens	28.75
Ironton, O., ovens	28.00
Cincinnati, deld.	28.25
Kearny, N. J., ovens	28.75
Lone Star, Tex., ovens	19.50
Milwaukee, ovens	29.50
Neville Island (Pittsburgh), Pa., ovens	28.25
Painesville, O., ovens	29.50
Cleveland, deld.	31.55
Philadelphia, ovens	28.50
St. Louis, ovens	28.50
St. Paul, ovens	28.50
Chicago, deld.	31.82
Swedeland, Pa., ovens	26.50
Terre Haute, Ind., ovens	28.75

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.50-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.	

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The man's right of course, and here's why: As a welder, it provides a full 200 amperes of ac welding current . . . handles ac or ac-dc electrodes up to 3/16". As a power plant, the rotating field design generator—coupled to Onan CK engine—supplies 4500 watts of 110/220 current; or, 1000 watts of dc power while welding. Waterproof and light weight (435 lbs.), the AEA-200-L offers easy portability, all-weather operation and real versatility. Rubber-tired running gear and road trailer available. Model AEA-200, without auxiliary power, weighs 420 lbs. Larger engine driven units to 350 amperes with generator output of 10KW.

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Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $98.50; 19-21% Mn, 1-3% Si, $96; 16-19% Mn, $94.00.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $215. Duquesne, Johnstown, Sheridan, Pa.; Philo, O.; Tacoma, Wash.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $223 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump bulk, max. 0.07% C, 31.95c per lb of contained Mn, carload packed 33c, ton lots 34.5c, less ton 35.7c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 22.85c per lb of contained Mn, packed, carload 23.9c, ton lot 25.5c, less ton 26.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 31.5c; 2000 lb to min carload, 33.5c; 250 lb to 1999 lb, 35.5c; less than 250 lb, 36.5c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn.; freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O. freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12c per lb of alloy. Packed, c.l. 13c, ton 13.45c, less ton 14.45c, f.o.b. Alloy W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract ton lot 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 32.50c per lb contained Cr, 0.02% max 39.25c, 0.03% max 38.75c, 0.06% max 37.25c, 0.1% max 36.75c, 0.15% max 36.50c, 0.2% max 36.25c, 0.5% max 36.00c, 1.0% max 35.25c, 1.5% max 35.10c, 2.0% max 35.00c. Ton lot, add 3.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 27.4c per lb contained Cr. Packed, c.l. 28.7c, ton 30.5c, less ton 32. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 5 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot 22.06c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, cariot, packed 2" x D plate (about ⅛" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.29. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max., C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 59c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

35-39% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed, 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.75c per lb of contained Si. Packed, c.l. 14.85c, ton lot 16.3c, less ton 17.95c. F.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lot, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed, c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%; Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 23.00c per lb of alloy, carload packed 24.45c, ton lot 26.75c, less ton 28.25c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 13c per lb of briquet, c.l. packed, pallets 13.2c, bags 14c; 3000 lb to c.l., pallets 14.4c; 2000 lb to c.l. bags, 15.2c less ton 16.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 13.55c per lb of briquet, c.l. packed, pallets, 13.75c; bags 14.55c, 3000 lb to c.l., pallets, 14.95c; 2000 lb to c.l., bags, 15.75c; less ton 16.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.15c per lb of briquet; packed, pallets, 7.35c; bags 8.15c; 3000 lb to c.l., pallets, 8.95c; 2000 lb to c.l. bags 9.75c; less ton 10.65c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2¼ lb and containing 1 lb of Si). Carload, bulk 7.3c. Packed, pallets 7.8c; bags 8.30c; 3000 lb to c.l. pallets 9.1c; 2000 lb to c.l. bags 9.9c; less ton 10.8c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W. $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D. $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ½-in. x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 5-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 17.50c. Packed c.l. 18.50c, 2000 lb to c.l. 19.50c, less than 2000 lb 20c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.68 in all sizes except powdered which is $1.74; Washington, Pa., furnace, $1.54.

Technical Molybdic-Oxide: Per lb contained Mo, in cans, $1.39, f.o.b. Langeloth, Pa.; in bags, $1.33, f.o.b. Langeloth and Washington, Pa.

(*Concluded from page 216*)

330 tons, dormitory, University of Oregon, Portland, Oreg., to A. Young & Co., Portland.

235 tons, addition, William street building, New Jersey Bell Telephone Co., Newark, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, Noxon Rapids power project for Washington Water Power Co., to Pacific Car & Foundry Co., Seattle.

STRUCTURAL STEEL PENDING

2000 tons, bridge connection, Connecticut turnpike, Oak street, New Haven; bids out shortly.

1000 tons, public school No. 45, Manhattan, New York, Caristo Construction Co., Brooklyn, N. Y., low on general contract.

250 tons, plant expansion, Olympic Brewing Co., Olympia, Wash.; bids in.

200 tons, construction for Atomic Energy Commission, Idaho Falls, Idaho; bids Sept. 12.

145 tons, also reinforcing, Washington state road projects, Grant and Klickitat counties; bids to Olympia, Wash., Sept. 11.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1325 tons, Kneeland-Dover street spur, Central artery, Boston, to Joseph T. Ryerson & Son Inc., Boston, through Berke-Moore Co. Inc., Boston, general contractor; also 33,900 linear ft, steel piles, to Bethlehem Steel Co., Bethlehem, Pa.

975 tons, municipal sewer work, Philadelphia; 500 tons for the Frankford creek project going to U. S. Steel Supply Division, U. S. Steel Corp., Pittsburgh, and 475 tons of other work to Taylor-Davis Inc., Philadelphia.

550 tons, Einstein Medical Hospital, Philadelphia, to American Steel Engineering Co., Philadelphia; also 870 tons of structurals to Bethlehem Steel Co., Bethlehem, Pa.

500 tons, Wanamaker branch store, Jenkintown, Pa., through the Turner Construction Co., to U. S. Steel Supply Division, U. S. Steel Corp., Pittsburgh.

350 tons, engineering building, University of Delaware, Newark, Del., to Taylor-Davis Inc., Philadelphia.

175 tons, warehouse, Kaiser Metal Products Co., Bristol, Pa., to American Steel Engineering Co., Philadelphia.

100 tons, Donner X-Ray Laboratory, University of Pennsylvania, Philadelphia, to the Concrete Steel Co., that city.

REINFORCING BARS PENDING

1870 tons, three Washington state I-beam bridges, King county; general contract to Erickson Paving Co., Bellevue, Wash., low at $826,546.

100 tons, also 70 tons, shapes, Yakima river bridge; bids to Benton county, Prosser, Wash., Sept. 6.

70 tons plus, 130-ft Bureau of Roads bridge, Oregon; A. L. Harding Inc., Stayton, Oreg., low at $661,047.

Unstated, 5-story classroom structure, Seattle University, Seattle; bids Sept. 14; John W. Maloney, Seattle, is architect.

PLATES . . .

PLATES PENDING

5755 tons, hull, general stores supply, Navy, Philadelphia.

2000 tons, two water reservoirs at Bitter Lake, alternatives for prestressed concrete; Pittsburgh-Des Moines Steel Co., Seattle, apparently low to Seattle for plate units at $854,106.

100 tons, 50,000-gal elevated tank, Bremerton, Wash.; Pittsburgh-Des Moines Steel Co., Seattle, apparently low.

PIPE . . .

CAST IRON PIPE PLACED

416 tons, 4 to 16 in. for Yakima, Wash., to U. S. Pipe & Foundry Co., Seattle.

233 tons, 4 to 16 in. for Yakima, Wash., to Pacific States Cast Iron Pipe Co., Seattle.

CAST IRON PIPE PENDING

300 tons plus, 10,000 ft of 6, 8, and 12 in.; bids to John J. Sugars, city clerk, Everett, Wash., Sept. 14.

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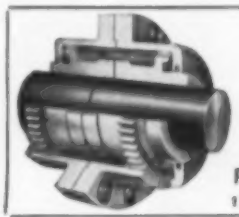
Pacific Coast Representative: *A. C. Berbringer, Inc., 334 N. San Pedro St., Los Angeles, California.* Canada: *P. F. Barker Machinery Co., Toronto, Canada.*



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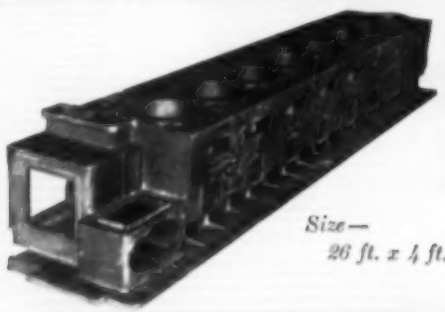

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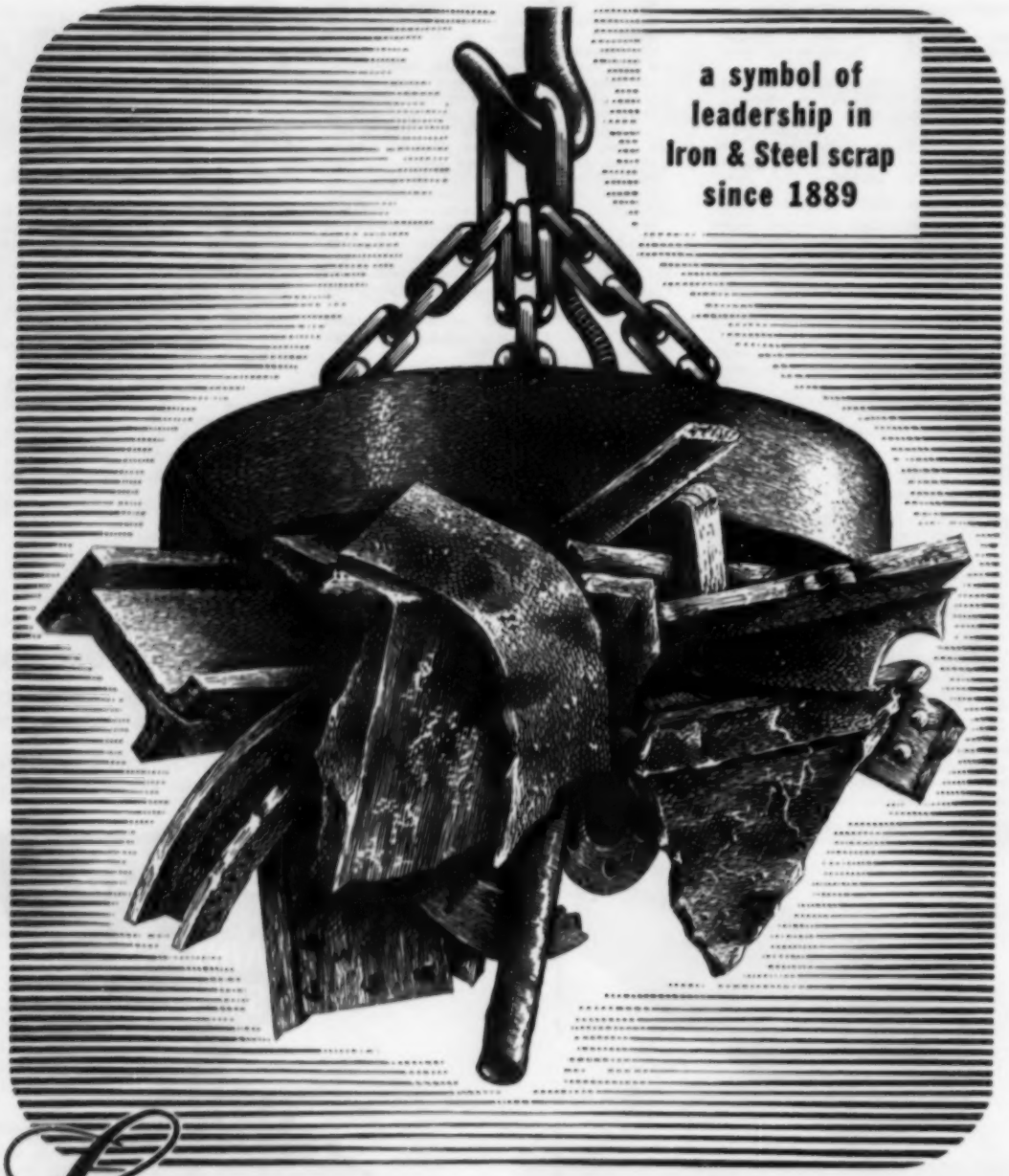

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Scrap Loses Some of Its Steam

Market tends to level off following sharp price rise of past several weeks. Strong undertone continues, pending resumption of active buying by mills

Scrap Prices, Page 230

Pittsburgh—A mill on the fringe of this area confirmed the present high levels of scrap prices. It purchased No. 1 heavy melting at prices roughly equivalent to those paid by a major Pittsburgh firm one week earlier.

Since this purchase maintained the level set previously, it marked a pause in the upward movement of scrap prices here. While turnings and borings continue to increase gradually, several other grades have moved slightly downward. Plate scrap and cut structurals sold for $1 a ton less than they did one week ago.

Chicago—The market appeared steady upon resumption of trading activity following the Labor Day holiday. Prices hovered around the preceding week's record levels. Collection activity has increased stocks in dealers' yards to high levels. This, coupled with resistance to the high prices, is creating some concern among dealers. Most feel that high-level industrial activity will continue, and that prices will hold, perhaps even edge upward. The only change noted last week was an advance of $1 on machine shop turnings to $35-$36.

Philadelphia—Steel scrap prices are unchanged. But the undertone of the market is still strong, with a livelier export situation a contributing factor locally. No. 1 cupola cast is higher at $53-$55, delivered. Heavy breakable is up $1 to $57. Due to a typographical error, last week this grade was quoted incorrectly at $66 instead of $56.

Boston — No. 2 heavy melting steel and bundles for export, delivered dock, are higher, advancing $2 a ton within the $4 freight area. Steel scrap for eastern Pennsylvania shipment is firm, but prices are unchanged. Cast grades are slightly stronger, some prices being up $1.

Cleveland—The market here and in the Valley has tamed down somewhat, compared with activity last month. Still, the market is strong, and the No. 1 grades of steelmaking scrap are quoted up another $1 on the basis of a moderate purchase of No. 1 heavy melting steel at $63.50 by a Cleveland mill.

Cincinnati — Scrap prices have climbed to the highest point on record in this market. No. 1 heavy melting is quoted at $57-$58, up $1 from a week ago. At this high

(*Please turn to page* 235)

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Sept. 5	$58.83
Aug. 29	58.83
Aug. Avg.	57.13
Sept. 1955	44.42
Sept. 1951	44.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	58.00-59.00
No. 2 heavy melting	51.00-52.00
No. 1 bundles	58.00-59.00
No. 2 bundles	47.00-48.00
No. 1 busheling	58.00-59.00
Machine shop turnings	*39.00-40.00*
Mixed borings, turnings	*39.00-40.00*
Short shovel turnings	*41.00-44.00*
Cast iron borings	*41.00-44.00*
Cut structurals, 3 ft lengths	*67.00-68.00*
Heavy turnings	*51.00-54.00*
Punchings & plate scrap	*67.00-68.00*
Electric furnace bundles	*67.00-68.00*

Cast Iron Grades

No. 1 cupola	56.00-57.00
Heavy breakable cast	50.00-51.00
Unstripped motor blocks	36.00-37.00
No. 1 machinery cast	58.00-59.00

Railroad Scrap

No. 1 R.R. heavy melt.	67.00-68.00
Rails, 2 ft and under	75.00-76.00
Rails, 18 in. and under	76.00-77.00
Rails, random lengths	72.00-73.00
Railroad specialties	74.00-75.00

Stainless Steel Scrap

18-8 bundles & solids	*395.00-405.00*
18-8 turnings	*275.00-290.00*
430 bundles & solids	110.00-120.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	*62.50-63.50*
No. 2 heavy melting	44.00-45.00
No. 1 bundles	*62.50-63.50*
No. 2 bundles	40.00-41.00
No. 1 busheling	*62.50-63.50*
Machine shop turnings	32.50-33.50
Mixed borings, turnings	36.50-37.50
Short shovel turnings	36.50-37.50
Cast iron borings	36.50-37.50
Low phos.	62.50-63.50
Cut structural plates 2 ft and under	*68.00-69.00*
Alloy free, short shovel turnings	43.00-44.00
Electric furnace bundles	62.50-63.50

Cast Iron Grades

No. 1 cupola	*57.00-58.00*
Charging box cast	50.00-51.00
Heavy breakable cast	48.00-49.00
Stove plate	54.00-55.00
Unstripped motor blocks	36.00-37.00
Brake shoes	44.00-45.00
Clean auto cast	56.00-57.00
Burnt cast	43.00-44.00
Drop broken machinery	*59.00-60.00*

Railroad Scrap

No. 1 R.R. heavy melt.	65.00-66.00
R.R. malleable	70.00-71.00
Rails, 2 ft and under	*82.00-83.00*
Rails, 18 in. and under	*83.00-84.00*
Rails, random lengths	*76.00-77.00*
Cast steel	69.00-70.00
Railroad specialties	74.00-75.00
Uncut tires	73.00-74.00
Angles, splice bars	*75.00-76.00*
Rails, rerolling	75.00-76.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	380.00-390.00
18-8 turnings	250.00-260.00
430 clips, bundles, solids	100.00-110.00
430 turnings	50.00-60.00

YOUNGSTOWN

No. 1 heavy melting	*65.00-66.00*
No. 2 heavy melting	47.00-48.00
No. 1 bundles	*65.00-66.00*
No. 2 bundles	43.00-44.00
No. 1 busheling	*65.00-66.00*
Machine shop turnings	34.00-35.00
Short shovel turnings	38.00-39.00
Cast iron borings	38.00-39.00
Low phos.	65.00-66.00
Electric furnace bundles	65.00-66.00

Railroad Scrap

No. 1 R.R. heavy melt.	66.00-67.00

CHICAGO

No. 1 heavy melting	58.00-60.00
No. 2 heavy melting	47.00-48.00
No. 1 factory bundles	62.00-63.00
No. 1 dealer bundles	56.00-57.00
No. 2 bundles	43.00-44.00
No. 1 busheling	58.00-60.00
Machine shop turnings	*35.00-36.00*
Mixed borings, turnings	35.00-36.00
Short shovel turnings	35.00-36.00
Cast iron borings	35.00-36.00
Cut structurals, 3 ft	66.00-67.00
Punchings & plate scrap	67.00-68.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	47.00-48.00
Unstripped motor blocks	41.00-42.00
Clean auto cast	57.00-58.00
Drop broken machinery	57.00-58.00

Railroad Scrap

No. 1 R.R. heavy melt.	61.00-62.00
R.R. malleable	71.00-72.00
Rails, 2 ft and under	81.00-82.00
Rails, 18 in. and under	82.00-83.00
Angles, splice bars	73.00-74.00
Rails, rerolling	83.00-84.00

Stainless Steel Scrap

18-8 bundles & solids	405.00-425.00
18-8 turnings	310.00-325.00
430 bundles & solids	105.00-110.00
430 turnings	52.50-57.50

DETROIT

Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	54.00
No. 2 heavy melting	43.00
No. 1 bundles	54.00
No. 2 bundles	39.00
No. 1 busheling	54.00
Machine shop turnings	29.00
Mixed borings, turnings	32.00
Short shovel turnings	34.00
Punchings & plate scrap	57.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	41.00
Stove plate	42.00
Heavy breakable	41.00
Unstripped motor blocks	32.00
Clean auto cast	53.00
Malleable	52.00

BIRMINGHAM

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	42.00-43.00
No. 2 bundles	34.00-35.00
No. 1 busheling	42.00-43.00
Cast iron borings	25.00-26.00
Short shovel turnings	29.00-30.00
Machine shop turnings	29.00-30.00
Bar crops and plate	*57.00-58.00*
Structural & plate, 2 ft	*56.00-57.00*
Short steel turnings	34.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	51.00-52.00
Stove plate	49.00-50.00
Unstripped motor blocks	*44.00-45.00*
Charging box cast	*40.00-41.00*
No. 1 wheels	*43.00-44.00*

Railroad Scrap

No. 1 R.R. heavy melt.	50.00-51.00
Rails, 18-in. and under	*71.00-72.00*
Rails, rerolling	*71.00-75.00*
Rails, random lengths	*65.00-66.00*
Angles, splice bars	64.00-65.00

PHILADELPHIA

No. 1 heavy melting	59.00
No. 2 heavy melting	56.00
No. 1 bundles	59.00
No. 2 bundles	49.00
No. 1 busheling	59.00
Electric furnace bundles	61.00
Mixed borings, turnings	41.00
Machine shop turnings	41.00
Short shovel turnings	45.00
Heavy turnings	54.00
Structurals & plates	62.00-63.00
Couplers, springs, wheels	68.00
Rail crops, 2 ft & under	71.00-72.00

Cast Iron Grades

No. 1 cupola	*53.00-55.00*
Malleable	68.00
Heavy breakable cast	*57.00*
Drop broken machinery	58.00-59.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	52.00-53.00
No. 2 heavy melting	42.00-43.00
No. 1 bundles	52.00-53.00
No. 2 bundles	41.00-42.00
Machine shop turnings	*31.00-32.00*
Mixed borings, turnings	*31.00-32.00*
Short shovel turnings	*36.00-37.00*
Low phos. (structural & plate)	53.00-54.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Unstripped motor blocks	36.00-37.00
Heavy breakable	*48.00-48.50*

Stainless Steel

18-8 sheets, clips, solids	350.00-360.00
18-8 borings, turnings	190.00-200.00
430 sheets, clips, solids	115.00-120.00
410 sheets, clips, solids	105.00-110.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	51.00-51.50
No. 2 heavy melting	38.50-39.50
No. 1 bundles	51.00-51.50
No. 2 bundles	36.50-37.50
No. 1 busheling	51.00-51.50
Machine shop turnings	27.00-28.00
Mixed borings, turnings	29.00-30.00
Short shovel turnings	32.00-33.00
No. 1 cast	*44.00-44.50*
Mixed cupola cast	*39.50-40.00*
No. 1 machinery cast	*45.50-46.00*

BUFFALO

No. 1 heavy melting	56.00-57.00
No. 2 heavy melting	43.00-44.00
No. 1 bundles	56.00-57.00
No. 2 bundles	40.00-41.00
No. 1 busheling	56.00-57.00
Mixed borings, turnings	34.00-35.00
Machine shop turnings	31.00-32.00
Short shovel turnings	35.00-36.00
Cast iron borings	34.00-35.00
Low phos.	*60.00-61.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	47.00-48.00
No. 1 machinery	53.00-54.00

Railroad Scrap

Rails, random lengths	*60.00-61.00*
Rails, 3 ft and under	*66.00-67.00*
Railroad specialties	57.00-58.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*57.00-58.00*
No. 2 heavy melting	*47.00-48.00*
No. 1 bundles	*57.00-58.00*
No. 2 bundles	*44.00-45.00*
No. 1 busheling	*57.00-58.00*
Machine shop turnings	35.50-36.50
Mixed borings, turnings	*37.00-38.00*
Short shovel turnings	*40.00-41.00*
Cast iron borings	*37.00-38.00*
Low phos., 18 in.	62.00-63.00

Railroad Scrap

No. 1 cupola	*48.00-49.00*
Heavy breakable cast	*47.00-48.00*
Charging box cast	*48.00-49.00*
Drop broken machinery	*58.00-59.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*62.00-63.00*
Rails 18 in. and under	*77.00-78.00*
Rails random lengths	*68.00-69.00*

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*50.00*
No. 2 heavy melting	*45.00*
No. 1 bundles	*50.00*
No. 2 bundles	*41.00*
No. 1 busheling	*50.00*
Machine shop turnings	*30.00*
Short shovel turnings	36.00

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	*44.00*
Heavy breakable cast	*44.00*
Unstripped motor blocks	*41.00*
Brake shoes	*51.00*
Clean auto cast	*54.00*
Stove plate	*45.50*

Railroad Scrap

No. 1 R.R. heavy melt.	*63.00*
Rails, 18 in. and under	*80.00*
Rails, random lengths	*76.50*
Rails, rerolling	*83.00*
Angles, splice bars	70.00

SEATTLE

No. 1 heavy melting	*50.00*
No. 2 heavy melting	*46.00*
No. 1 bundles	42.00
No. 2 bundles	31.00
Machine shop turnings	25.00-27.00
Mixed borings, turnings	25.00-27.00
Electric furnace No. 1	*58.00-60.00*

Cast Iron Grades

No. 1 cupola	*46.00-48.00*
Heavy breakable cast	*42.00-44.00*
No. 1 wheels	37.00
Unstripped motor blocks	*44.00*
Stove plate (f.o.b. plant)	*35.00-37.00*

LOS ANGELES

No. 1 heavy melting	44.00
No. 2 heavy melting	40.00
No. 1 bundles	43.00
No. 2 bundles	33.00
Machine shop turnings	25.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	50.00

SAN FRANCISCO

No. 1 heavy melting	*50.00*
No. 2 heavy melting	*47.00*
No. 1 bundles	*48.00*
No. 2 bundles	*42.00*
Machine shop turnings	*30.00*
Mixed borings, turnings	*30.00*
Cast iron borings	*30.00*
Heavy turnings	*30.00*
Short shovel turnings	*33.00*
Cut structurals	*58.00*

Cast Iron Grades

No. 1 cupola	*55.00*
Charging box cast	45.00-47.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	*47.00*
Clean auto cast	*55.00*
No. 1 wheels	45.00-47.00
Drop broken machinery	*55.00*

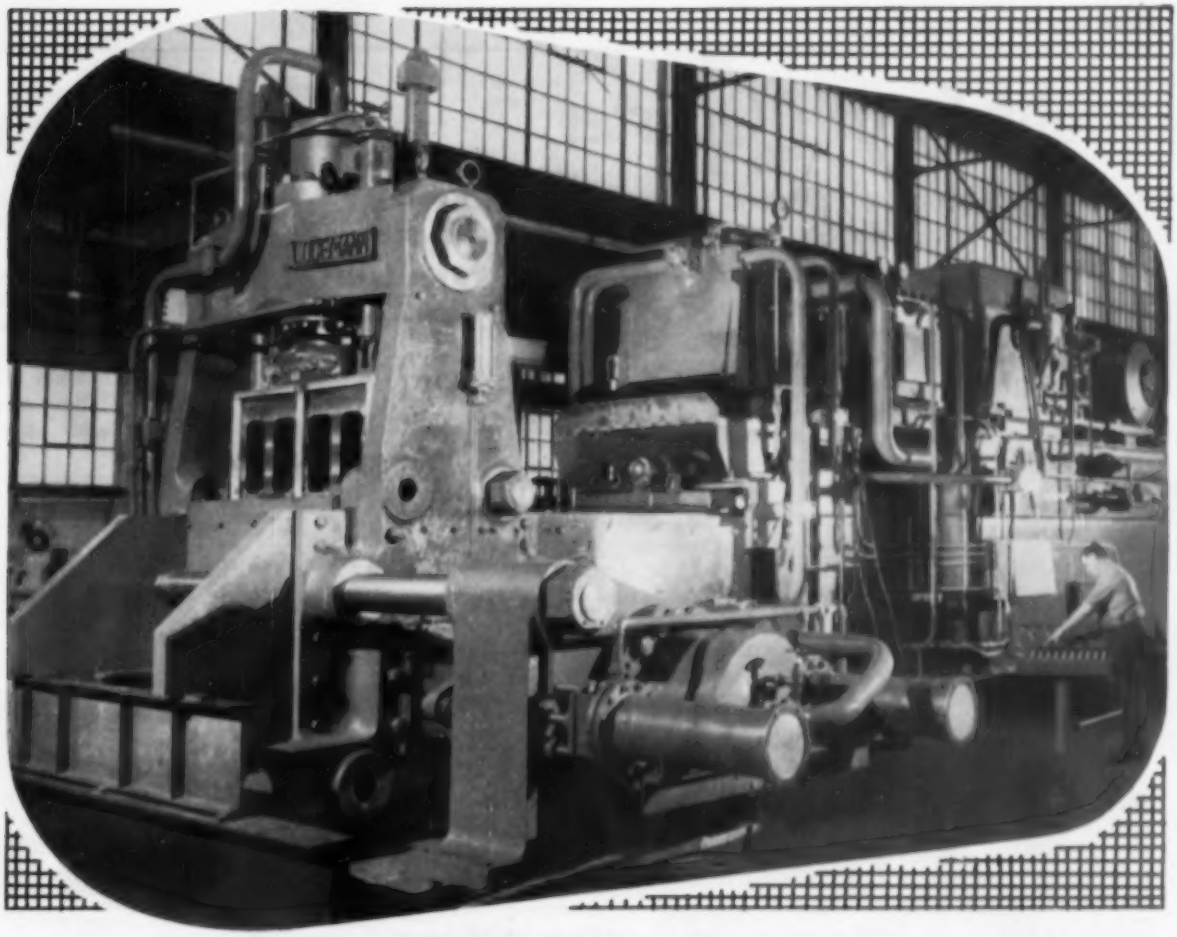
HAMILTON, ONT.

No. 1 heavy melting	49.00
No. 2 heavy melting	44.00
No. 1 bundles	49.00
No. 2 bundles	41.50
Mixed steel scrap	43.00
Busheling, new factory:	
Prepared	47.00
Unprepared	43.00
Short steel trunings	34.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., shipping point.



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Bright Fourth Quarter

As across-the-board sales remain high and motordom lets orders for its new model run, nonferrous men are predicting a bullish fourth quarter parallel with last year's

Nonferrous Metal Prices, Pages 234 & 235

THERE is growing optimism about what the fourth quarter will bring in the nonferrous industries. August shipment figures are in, and most observers are satisfied with them.

Copper—Wire and cable (particularly utility cable) sales are holding on a high plateau. Says one observer: "While we can't say sales are showing substantial gains, we are holding at satisfactory levels." Brass mill sales for September are rising rapidly as Detroit gives the go-ahead on components for '57 models.

After much ballyhoo, Britain now seems to be a bit hesitant to release any of the 36,000 tons of copper from its stockpile. Part of the tonnage (6000 tons) was scheduled for the London Metal Exchange in August but never made it. The Board of Trade explains that administrative problems, coupled with vacations, made it impossible to sell any of the red metal. Contends the board: The releases of copper, which may start in September, will be made in an orderly manner, so the market will not be disrupted.

Aluminum — August shipments were good, but affected by the aluminum strike. Spokesmen are anticipating a solid fourth quarter. Speculation is running high that most new cars will have as much as 5 lb more aluminum than the 1956s.

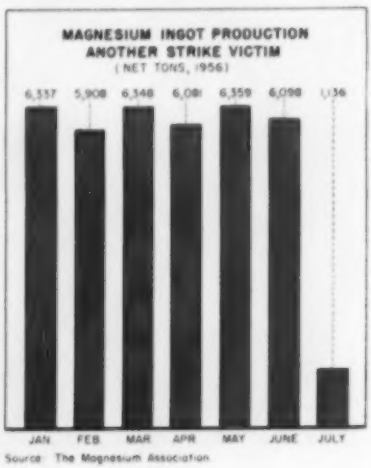
Looking to future automotive sales, Aluminum Co. of America, working jointly with Metallizing Engineering Co., reports that a coating of sprayed steel on aluminum cylinder walls "opens new horizons to designers working on the aluminum engine." The process calls for a thin layer of pure molybdenum between the aluminum and steel to serve as a bonding material. The aluminum piston, which does not function well on an aluminum cylinder wall, does work smoothly on a ferrous alloy surface. Says Alcoa: "This hard steel sprayed face does the job with wear to spare."

Zinc—Some diecasters have gone from taking minimum to maximum tonnages in the last ten days, reports one zinc salesman. Others explain that August totals were satisfactory—that all indications are for a fourth quarter which will be as good as the last three months of '55.

Lead—Sales continue to be good across the board. Battery makers are adding additional stability. While primary lead producers admit that sales have been from 10 to 20 per cent below those in the same period last year, they are quick to point out that the expected banner fourth quarter may bring the yearly total within a few percentage points of last year's.

Tin—Sales through August have paralleled 1955 totals. It is felt that the fourth quarter may see tin sales rise 5 to 10 per cent.

Magnesium—One spokesman reports that magnesium shipments have shown a gain during each month which was not affected by an industry strike. Fourth quarter magnesium shipments may be 20 to 30 per cent better than those in the last three months of 1955. Outlook: Magnesium shipments could show a 10 to 15 per cent gain for the year over '55 results. The rapidly rising demand for mill products will help the metal to record a peak year.



Source: The Magnesium Association

Nickel—Users, military and civilian, will continue to clamor for as much of the metal as they can get during the fourth quarter. Look for announcements giving details on new ore bodies during the remainder of this year.

Titanium — Fabricators are booked solid for the fourth quarter. It will be a record year for titanium in all departments. Sponge shipments will increase at least 50 per cent over the '55 total of 8000 tons. Mill shipments will be at record highs during the remainder of this year and into the first quarter of 1957.

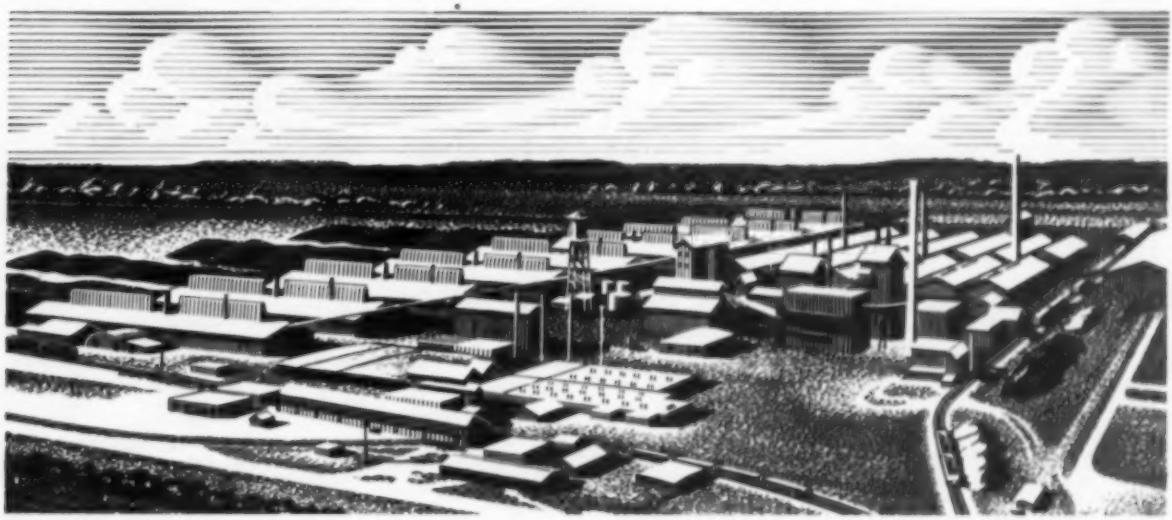
NONFERROUS PRICE RECORD

	Price Sept. 5	Last Change		Previous Price	Aug. Avg.	July Avg.	Sept., 1955 Avg.
Copper	39.90-40.00	Aug.	22, 1956	39.50-40.00	39.750	40.030	45.350
Lead	15.80	Jan.	13, 1956	16.30	15.800	15.800	14.920
Zinc	13.50	Jan.	6, 1956	13.00	13.500	13.500	12.940
Tin	100.75	Sept.	4, 1956	100.375	99.043	96.435	96.565
Nickel	64.50	Nov.	24, 1954	60.00	64.500	64.500	64.500
Aluminum	27.10	Aug.	10, 1956	25.90	26.700	25.900	24.400
Magnesium	35.25	Aug.	13, 1956	33.75	34.694	33.750	33.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

American Zinc and its products

from A *to* Z



SMELTER AT DUMAS, TEXAS

Dumas is one of the larger horizontal retort furnace plants in the United States. Here are produced Prime Western, Select, Brass Special and Intermediate grades of slab zinc for the galvanizing and brass industries. Roasting and sintering operations are also carried on at Dumas, making this plant an important factor in the widespread American Zinc picture.

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PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots, 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 214, 30.50; No. 356, 28.90. 50-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 40.00 deld. Conn. valley; 40.00 deld. Midwest; custom smelters, 39.00 deld.; lake, 40.00 deld.; fire refined, 39.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 98 + %, cups or ingots, $11.50; rod $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 25.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 50.00, f.o.b., Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand castings), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$267 per 76-lb flask.

Molybdenum: Estruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $103-$110 per troy oz from refineries.

Radium: $16-$21.60 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15.50 per lb.

Silver: Open market, 90.75 per troy oz.

Sodium: 16.50, e.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 100.75, prompt, 100.375.

Titanium: Sponge, 99.3+ %, grade A-1 ductile (0.3% Fe max), $3.00; grade A-2 (0.5% Fe max), $2.70 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom, f.o.b. shipping point; less than 1000 lb, add 15.00; 99+ % hydrogen reduced, $5.00. Treated ingot, $6.70.

Zinc: Prime Western, 14.00; brass special, 14.25; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10.00 per lb; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 27.00-30.75; No. 12 foundry alloy (No. 2 grade), 26.50-27.00; 5% silicon alloy, 0.60 Cu max, 28.25-28.50; 13 alloy, 0.60 Cu max, 28.25-28.50; 195 alloy, 28.75-29.00; 108 alloy, 27.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 27.00, grade 2, 26.25; grade 3, 25.50; grade 4, 25.00.

Brass Ingot: Red brass, No. 115, 37.55; tin bronze, No. 225, 48.00; No. 245, 43.50; high-leaded tin bronze, No. 305, 41.00; No. 1 yellow No. 405, 29.75; manganese bronze, No. 421, 33.00.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.91; rod, bar, wire, $1.88.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 45.35¢; l.c.l., 45.98. Weatherproof, 30,000-lb lots, 43.78; l.c.l., 44.53. Magnet wire deld., 15,000 lb or more, 52.65; l.c.l., 53.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheet and strip, $12.10-$13.00; sheared mill plate, $10.50-$12.00; wire, $9.50-11.50; forging billets, $7.25-$7.50; hot-rolled and forged bars, $7.75-$7.80.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes, H.R.	87	74	93
Seamless Tubes	122	110	153

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	64.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	58.10
1.125-1.500	55.20	53.90	59.00	58.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	54.20
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

ALUMINUM (continued)

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.136	46.90-45.40	....
0.125-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	39.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.60-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. widths or diam, 72-180 lengths.

Forging Stock: Round, Class 1, 42.30-55.90 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅛	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.90-47.50	61.50-65.80
12-14	46.20-47.70	62.20-66.80
15-17	46.40-48.30	63.50-68.50
18-20	47.00-48.80	65.50-71.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; 0.81 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.20; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0, 93.30. Tread plate, .188 in., 71.70; .250-2.0 in., 70.60. Tooling plate, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 16.00-16.50; old sheets, 13.00-13.50; borings and turnings, 9.00-

BRASS MILL PRICES

MILL PRODUCTS a — SCRAP ALLOWANCES f

	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	61.63b	58.35c	....	61.82	36.000	36.000	35.250
Yellow Brass	52.10	42.45d	52.94	55.01	27.250	27.000	25.125
Low Brass, 80%	55.55	55.79	54.39	55.66	30.625	30.375	29.875
Red Brass, 85%	57.19	57.13	57.73	60.00	31.875	31.625	31.125
Com. Bronze, 90%	59.08	59.02	59.62	61.64	33.125	32.875	32.375
Manganese Bronze	59.46	53.56	53.80	....	25.250	25.000	24.500
Muntz Bronze	53.84	49.65	....	....	25.625	25.375	24.875
Naval Brass	55.72	50.03	62.75	56.98	25.250	25.000	24.500
Silicon Bronze	65.22	64.41	65.26	67.26e	35.000	34.750	34.000
Nickel Silver, 10%	67.76	70.09g	70.09	....	32.750	32.500	16.375
Phos. Bronze, A, 5%	79.58	80.08	80.08	81.26	36.250	36.000	35.000

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

9.50; crankcases, 13.00-13.50; industrial castings, 13.00-13.50.

Copper and Brass: No. 1 heavy copper and wire, 31.00-31.50; No. 2 heavy copper and wire, 28.50-29.50; light copper, 26.50-27.00; No. 1 composition red brass, 25.50-26.00; No. 1 composition turnings, 24.00-24.50; yellow brass turnings, 15.00-15.50; new brass clippings, 22.00-22.50; light brass, 15.00-15.50; heavy yellow brass, 17.00-17.50; new brass rod ends, 19.50-20.00; auto radiators, unsweated, 19.00-19.50; cocks and faucets, 19.00-19.50; brass pipe, 20.50-21.00.

Lead: Heavy, 12.50-13.00; battery plates, 7.00-7.25; linotype and stereotype, 13.50-14.00; electrotype, 12.50-13.00; mixed babbitt, 13.00-13.50.

Monel: Clippings, 75.00-80.00; old sheets, 70.00-80.00; turnings, 70.00-80.00; rods, 75.00-80.00.

Nickel: Sheets and clips, 120.00-195.00; rolled anodes, 120.00-195.00; turnings, 100.00-165.00; rod ends, 120.00-195.00.

Zinc: Old zinc, 4.50-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 2.50-3.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 20.50; 3003 clippings, 20.25-20.50; 6151 clippings, 20.25-20.50; 5052 clippings, 20.25-20.50; 2014 clippings, 19.50-20.00; 2017 clippings, 19.50-20.00; 2024 clippings, 19.50-20.00; mixed clippings, 19.00-19.50; old sheets, 17.50-18.00; old cast, 17.50-18.00; clean old cable (free of steel), 19.25-28.50; borings and turnings, 17.00-19.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 62.00; light scrap, 57.00; turnings and borings, 42.00.

Copper and Brass: No. 1 heavy copper and wire, 33.75; No. 2 heavy copper and wire, 32.25; light copper 30.25; refinery brass (60% copper) per dry copper content, 30.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 34.00; No. 2 heavy copper and wire, 31.50; light copper, 29.00; No. 1 composition borings, 29.50; No. 1 composition solids, 30.00; heavy yellow brass solids, 21.00; yellow brass turnings, 18.50; radiators, 23.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 58.29; oval, 57.54, 5000-10,000 lb; electrodeposited, 59.25; 2000-5000 lb lots; cast, 52.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 10-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. Prices eastern delivery.

Tin: Bar or slab; less than 200 lb, $1.185; 200-499 lb, $1.170; 500-999 lb, $1.165; 1000 lb or more, $1.160.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 30.25, over 10,000 lb, 29.50.

Copper Cyanide: 100-1000 lb, 80.50.

Copper Sulphate: 500-1900 lb, 21.15; 2000 lb and over, 18.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.5; 10,000 lb and over, 38.50; prices eastern delivery.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.35; prices eastern delivery.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 71.40; 100-600 lb, 62.90; 700-1900 lb, 60.40; 2000-9900 lb, 58.70; 10,000 lb or more, 57.50.

Stannous Chloride (anhydrous): Less than 25 lb, $1.683; 25 lb, $1.333; 100 lb, $1.183; 400 lb, $1.159; 5200-19,600 lb, $1.037; 20,000 lb or more, 91.50.

Stannous Sulphate: Less than 50 lb, $1.31; 50 lb, $1.01; 100-1900 lb, 99.00; 2000 lb or more, 97.00.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

(*Concluded from page 229*)

level scrap is flowing freely. Railroad grades are up $2 from last week's level.

New York—Brokers have advanced their buying prices on machine shop turnings and mixed borings and turnings to $31-$32; on short shoveling turnings to $36-$37; and on heavy breakable cast to $48-$48.50. All other grades are unchanged, though strong.

Buffalo—A local mill purchased a limited tonnage of No. 2 grades at price advances of $4 a ton, paying $48 for No. 2 heavy melting and $45 for No. 2 bundles. These prices have not been recognized as representative of the market because of the limited tonnage involved in the purchase. Later sales to mills this month are expected to provide a more accurate reflection of the market.

Prices on the specialty grades have advanced again due to heavy demand. Low phos is up $2 to $61, and rails are up $2 to $61 for uncut, and $67 for 3 ft and under.

Supplies of better grades are tight, but secondary grades are more plentiful. There is a steady call for cast scrap from users in western New York and the nearby Canadian market.

Detroit—Prices are holding in this market. Dealers and brokers feel prices are at their peak and look for a decline to start late in September as auto production picks up and scrap generation rises.

Birmingham — The domestic scrap market continues dull, but strong activity is noted in exports. Purchasers of steelmaking grades have been out of the market since placing orders immediately following the steel strike settlement.

Seattle—Resumption of mill operations at capacity and continued strong export demand resulted in another advance of $4 in the scrap market last week. Receipts are heavy, current price levels being attractive.

Los Angeles — Scrap from the Orient is flowing through Los Angeles ports at a rapidly increasing clip. Los Angeles harbor officials estimate that more than 500,000 tons of scrap from Japan will enter the city by June, 1957.

PLATE ROLL

ONE PLATE ROLL, CAPACITY THREE QUARTER INCH BY 30 FEET, PYRAMID TYPE, DROP END, WITH ALL MOTORS AND AUXILIARY EQUIPMENT. MUST BE IN FIRST CLASS CONDITION AND GUARANTEED. PREFERABLY FAIRLY NEW. PLEASE REPLY IMMEDIATELY TO MR. R. C. PALMER, VICE PRESIDENT, CHARGE OF OPERATIONS. ALSO, WE ARE INTERESTED IN PURCHASING A LARGE HEAVY DUTY ANGLE OR FRAME BENDING ROLL.

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TECHNICAL FILE ADMINISTRATOR — Sound metallurgical education is essential. Should have a knowledge of library science through specialized education or research experience. Should have knowledge of a wide range of metallurgical processes and familiarity with the metals industry. Must have the ability to write accurately and fluently.

METALLURGIST OR METALLURGICAL ENGINEER—For field development work on use of alloys in electric steel melting and high temperature alloys. B.S. Degree, several years experience and moderate travel is required.

SALARY: Commensurate with qualifications and past experience.

Please send resume, present salary, and salary requirements to:

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Penton Bldg. Cleveland 13, Ohio

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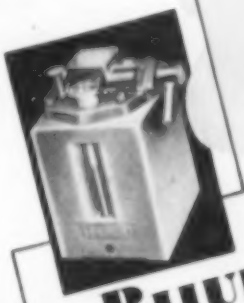

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Hand oiling is costly! It wastes time and money . . . steals valuable production hours . . . means extra down-time, fire risk, repair bills, replacement parts and causes product damage from excess lubricant.

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***Rely on your Acme Idea Man** for help with your packaging and shipping problems. He will discuss practical material handling techniques and their application to your operations. Call him at your nearest Acme Steel office, or write: Dept. SDU-96, Acme Steel Products Division, Acme Steel Company, 2840 Archer Avenue, Chicago 8, Illinois. In Canada, Acme Steel Co. of Canada, Ltd., 743 Warden Ave., Toronto 13, Ont.

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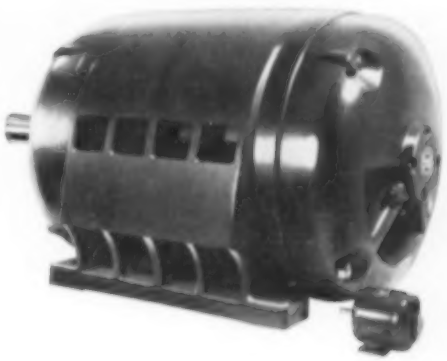
Master components are designed to combine in one compact unit to suit your needs exactly—all the way up to 400 H. P. Just ask us for information.



Motor Ratings ... ⅛ to 400 H.P. All phases, voltages, and frequencies.

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Dayton 1, Ohio

MASTER ELECTRIC MOTORS

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UNITED ENGINEERING & FOUNDRY CO., mounts roll necks on Timken tapered roller bearings, as in in this typical application.

Another record! TIMKEN® bearings on this plate mill have rolled 9 million tons of steel

THIS 100" 4-stand continuous plate mill — built by United Engineering — went into service at U. S. Steel's Homestead Works in 1936. Some of the Timken® tapered roller bearings on work rolls and back-up rolls have now rolled 9 million tons of steel—all 31 Timken bearings in the mill have rolled an average 5 million tons.

One big reason for this record is the fact that Timken bearings practically eliminate friction. They're geometrically designed and precision-made for true rolling motion. Timken bearings offer low frictional resistance. Higher rolling speeds are possible. Acceleration is easier. There's less skidding and scuffing between rolls. Less repair and maintenance.

By holding rolls rigid, Timken bearings help insure "on-gauge" operation, reduce scrap loss. And by holding shafts and housings concentric, Timken bearings make closures more effective, reduce lubricant leakage. Cut lubricant cost. Grease-lubricated Timken bearings require no tubes, pipes or reservoirs—cut lubrication system maintenance. No extra thrust devices are needed—the tapered construction of Timken bearings lets them take radial and thrust loads. Chuck mountings are more compact. Mill design is simplified.

Tonnage records indicate that the long life of Timken bearings keeps bearing cost per ton of steel rolled to a minimum. And prolonged roll life is assured because Timken bearings provide maximum roll neck strength, less wear. Mills using balanced proportion Timken roll neck bearings increase roll neck strength up to 60%—load ratings up to 40%. The balanced proportion design permits large diameter roll necks without increasing bearing O.D.—maximum capacity in less space.

For lowest cost per ton of steel rolled, look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable: "TIMROSCO".

See us at the IRON AND STEEL EXPOSITION, Sept. 25-28, Public Auditorium, Cleveland, Ohio, BOOTH Nos. 134, 135, 136, 137

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